



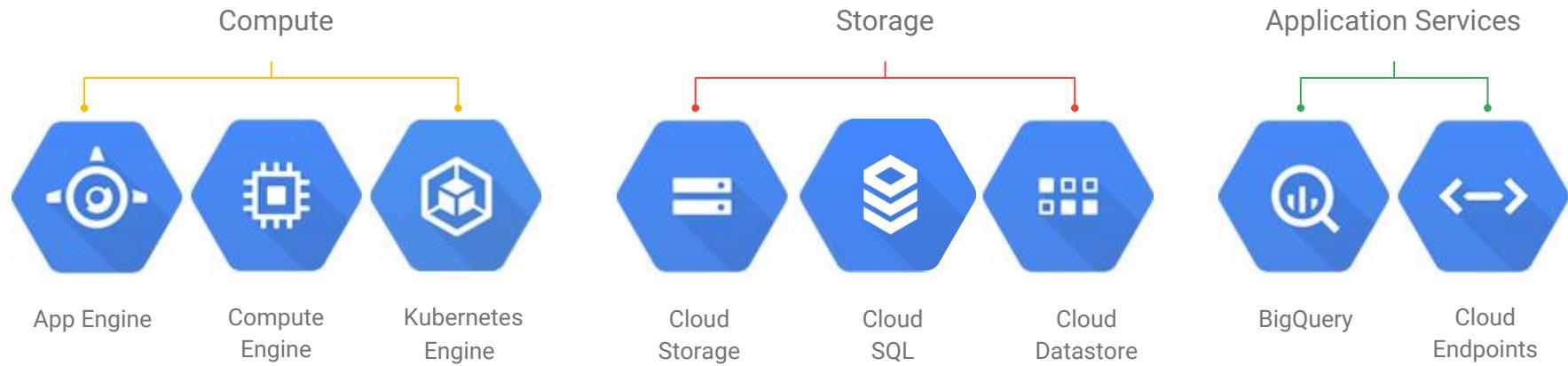
Google Cloud Platform

Easy Startup Guide

<http://goo.gl/ua5fQw> (link of this doc)



Google Cloud Platform



Organization of this Document

General services

- Project creation
- Billing configuration
- Development tool installation

Compute Engine (GCE)

Kubernetes Engine (GKE)

App Engine(Python)

Cloud Storage

BigQuery

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- General services
 - Creating a project
 - Enabling billing
 - Enabling the service
 - Installing the command tool (optional)

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- ComputeEngine
 - Adding a firewall
 - Creating an instance
 - Logging in
 - Providing a web page
 - Deleting an instance
 - (Supplemental) Adding a disk
 - Reference URL

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 - Setting up the SDK
 - Creating an application
 - Creating code
 - Performing a local test
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- BigQuery
 - Executing a query
 - Creating a table
 - Linking to Google Spreadsheet (option)
- CloudSQL
 - Creating an instance
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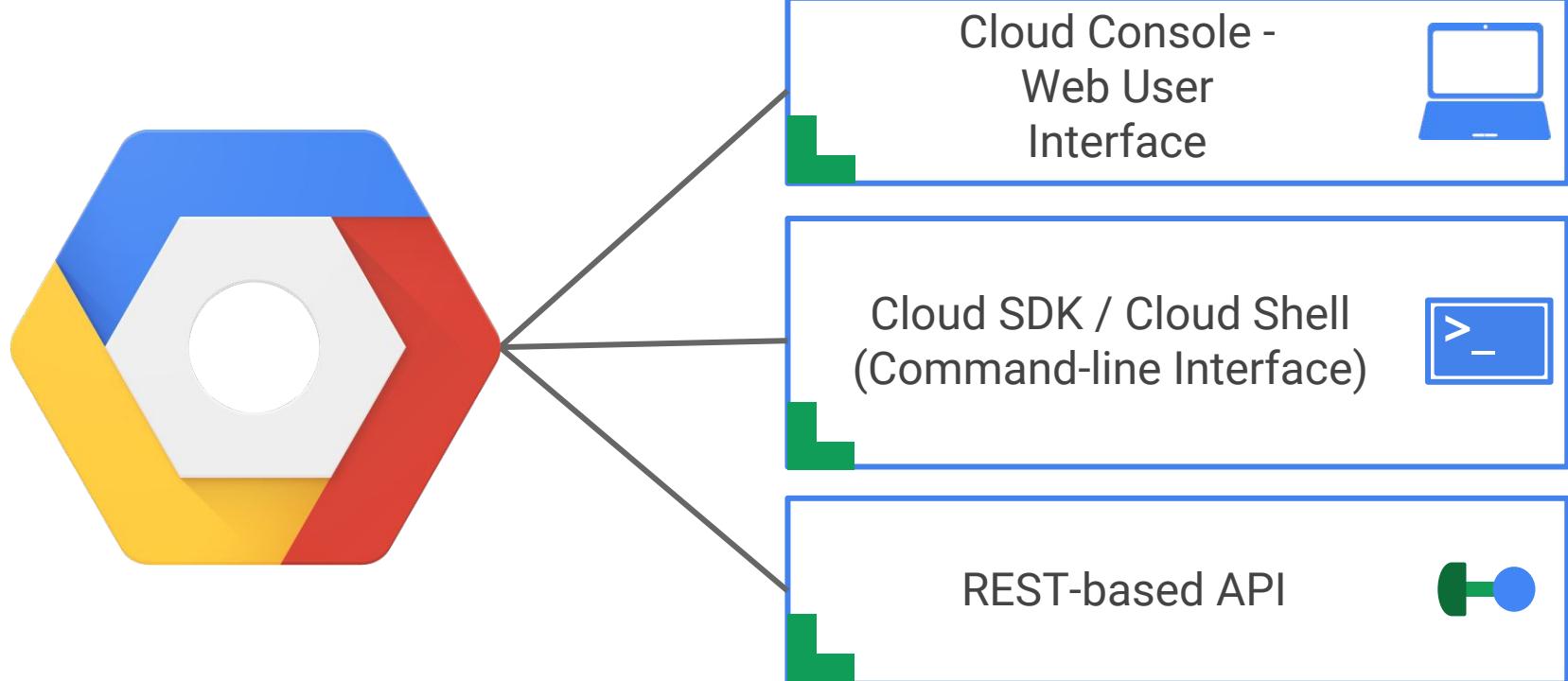
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- Load balancing across regions
 - Configuring an instance
 - Apache settings
 - Configuring the firewall
 - Load balancing settings
 - Sending traffic

General services



How to Access GCP



Accessing the Console

Access the Cloud Platform console to use the Google Cloud Platform.

Cloud Platform Console:

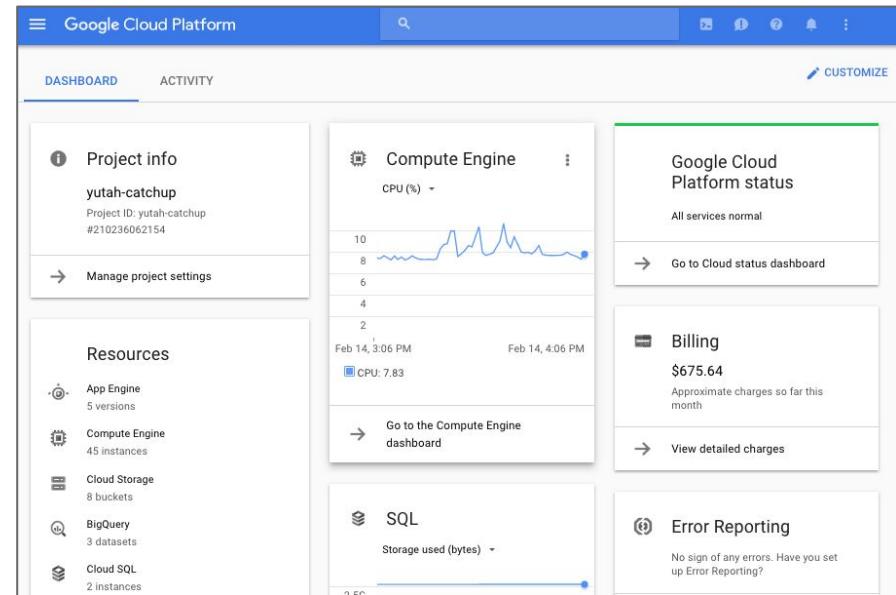
<https://console.cloud.google.com/>

→ If you have already signed up: [To P.17](#)

If you have not signed up yet:

[Apply for a free 12 month trial](#)

->[Explained on the next page](#)



Sign Up for Trial

- Login to the Google account (Gmail account)



Sign Up for Trial

- Agree to the Terms of Service displayed on the console

 Google Cloud Platform

ようこそ、Taro さん

Google Cloud Platform のインスタンス、ディスク、ネットワークなどのリソースを 1 か所で作成し、管理します。

Email preferences and Terms of Service
新機能のお知らせ、パフォーマンスに関するアドバイス、フィードバック調査、特典に関する最新情報をメールで受け取ります。

はい いいえ

すべてのサービスと関連 API について、適用される[利用規約](#)を遵守して利用することに同意します。

はい いいえ

[同意して続行](#)

Sign Up for Trial

- The free trial is applied the first time that the service is used
- Fill out the required form fields

The image shows the Google Cloud Platform free trial sign-up process across three screens.

Step 1: Initial Landing Page

Google Cloud Platform プロジェクトを選択 ▾ 検索

スタートガイド

Google Cloud Platform の無料トライアル

ご登録いただくと、\$300 相当のクレジットを獲得して 12か月間お試しいただけます。

登録する 登録する

Compute Engine を試す

Cloud Storage

Cloud Storage は簡単なストレージチュートリアルではトを作成し、サンプル URL リンクと共有する作業を進じできます。

使ってみる

Step 2: Trial Sign-up Form

Google Cloud Platform

Google Cloud Platform の無料トライアル Google

国 日本

日本

受諾

新機能のお知らせ、パフォーマンスに関するアドバイス、フィードバック調査、特典に関する最新情報をメールで受け取ります。

はい いいえ

Google Cloud Platform 無料トライアルの利用規約を読んだうえで内容に同意します。
続行するには [はい] を選択する必要があります

はい いいえ

同意して続行

Step 3: Trial Details and Summary

すべての Cloud Platform サービスへのアクセス

アプリや、ウェブサイト、サービスの構築と実行に必要な Firebase や Google Maps API などがすべて使用できます。

\$300 相当のクレジットを無料でご提供

ご登録いただくと、Google Cloud Platform で今後 12か月間ご利用いただける \$300 のクレジットを獲得できます。

無料トライアル期間が終了しても、自動的に請求されることはありません

ロボットによる登録ではないことを確認するため、クレジットカード番号を確認しております。有料アカウントに手動でアップグレードしない限り、課金されることはありません。

Sign Up for Trial

Enter the billing information.

- Name and address
- Payment method
(credit card or debit card)

Google Cloud Platform の無料試用 Google

口座の種類 ビジネス 個人

名前と住所 ?

郵便番号

都道府県

市区郡

住所 1 行目

企業/組織名

名前

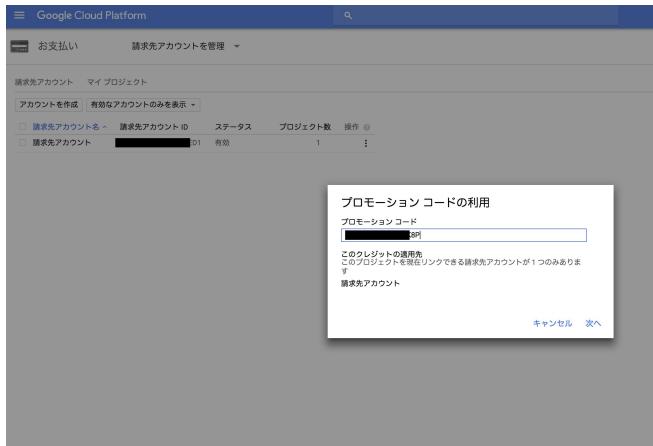
メインの連絡先

名前



Enable the Coupon Code as Needed

1. Logon to the GCP console
<https://console.cloud.google.com/>
2. Access the following URL
<https://cloud.google.com/redeem>
3. Enter the promotion code
4. Click [Payment] - [Billing Account] to check that the promotion code is enabled

A screenshot of the Google Cloud Platform Billing section showing the '概要' (Overview) tab. The left sidebar has '概要', '予算とアラート', '料金の履歴', '課金データのエクスポート', 'お支払い設定', and 'お支払い方法'. The main area shows '請求先アカウントの概要' and '請求先アカウント ID: 0 [redacted] D1'. It also shows a 'クレジット' (Credit) table with two rows: 'Free Trial' (2018/08/16, \$33,177.00, \$23,647.61) and 'Marketing Credit - Enterprise hands on session' (2019/02/02, \$32,699.00, \$32,699.00). At the bottom, it says 'この請求先アカウントにリンクされているプロジェクト' and lists 'kimil-dev-project'.

Checking the Billing Information

Check the billing information.

The screenshot shows the Google Cloud Platform Billing Overview page. The top navigation bar includes the Google Cloud Platform logo, a search bar, and a dropdown for 'My First Project'. The main content area has a sidebar on the left with links: 概要, 予算とアラート, 料金の履歴, 課金データのエクスポート, お支払い設定, and お支払い方法. The main panel displays the '概要' tab under '請求先アカウント' (Billing Account). It shows the ID: 123XXX-XXXXXX-XXXXXX. A red box highlights the 'クレジット' (Credit) section, which shows a balance of ¥33,668.00. Another red box highlights the 'この請求先アカウントにリンクされているプロジェクト' (Linked Projects) section, showing 'My First Project' with the ID: XXXXX-XXXXX-186716. To the right, there's a '請求先アカウントを閉鎖' (Close Billing Account) button.

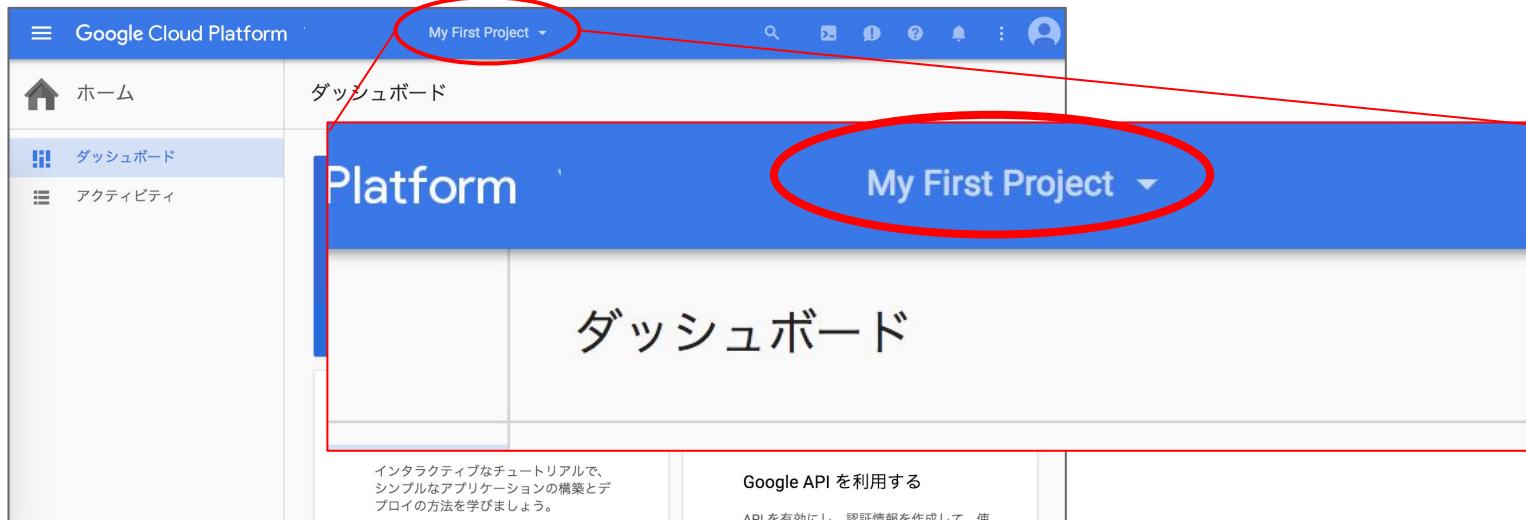
Check that the \$300 promotion has been registered under Credit

Check that the project is associated with the billing account

What is a Project ?

Unit by which GCP resources must always be linked

Ex: An instance exists under a development project



How to Check the Billing Amount

You can click [Payment Overview] to check the billing amount.

The screenshot shows the Google Cloud Platform Billing Overview page. The left sidebar has a 'お支払い' tab selected. The main area shows a summary for the '請求先アカウント' (Billing account) with a red circle highlighting the 'お支払いの概要' (Payment overview) link. Below it, the '残高' (Balance) is shown as ¥0. A red arrow points from the text 'Balance of payments' to this value. At the bottom, there's a section for '取引' (Transactions) with the message 'まだ取引を行っていません' (No transactions yet), and a red arrow points from the text 'Payment history' to this section.

Google Cloud Platform

Project ▾

お支払い 概要 請求先アカウント ▾

概要

請求先アカウントの概要 お支払いの概要

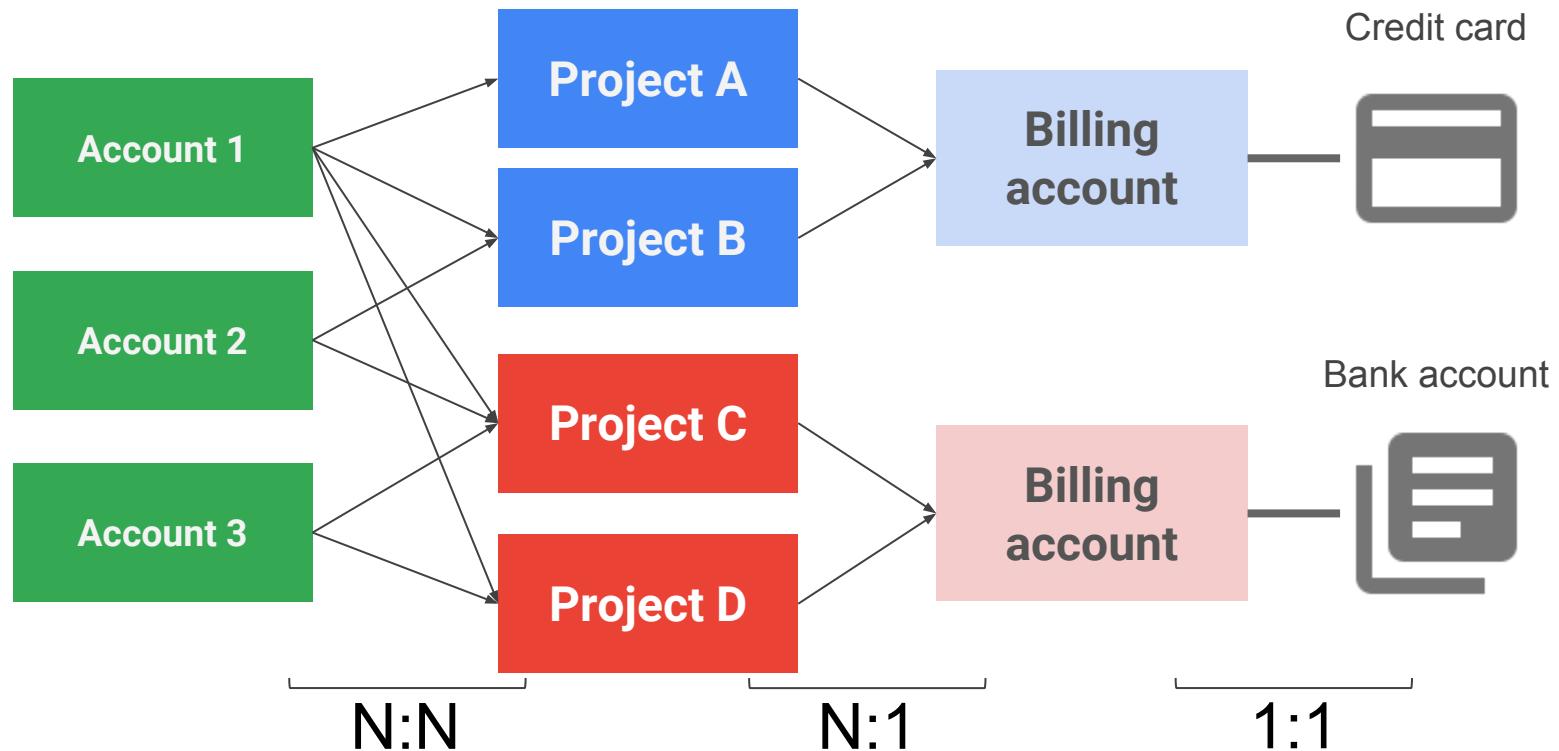
¥0 Balance of payments

取引

まだ取引を行っていません Payment history

取引を表示する

Reference: Relationship Between Billing and Projects



Command Line Tools



Command Tools Choices

Choices based on intended usage

- Use GCS ([explained on the next page](#))
 - Easily run a command line tool from the browser
 - Connect to an instance from the browser via SSH
- Locally install the gcloud SDK ([jump to the corresponding page](#))
 - Manipulate GCP resources from the local machine Terminal
 - Employ when using the local terminal to conduct development

Let's Try Using Google Cloud Shell

What is GCS?:

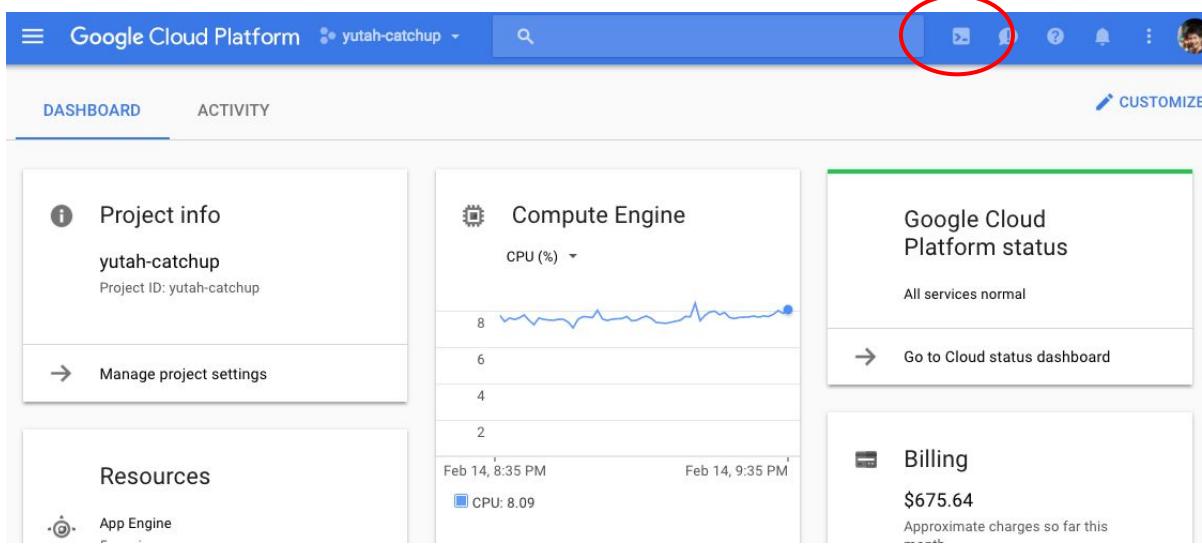
- A shell which can directly access cloud resources from the browser
- gcloud and other SDK, CLI tools are already installed



Let's Try Using Google Cloud Shell

Accessing CS:

- Just click the console one time

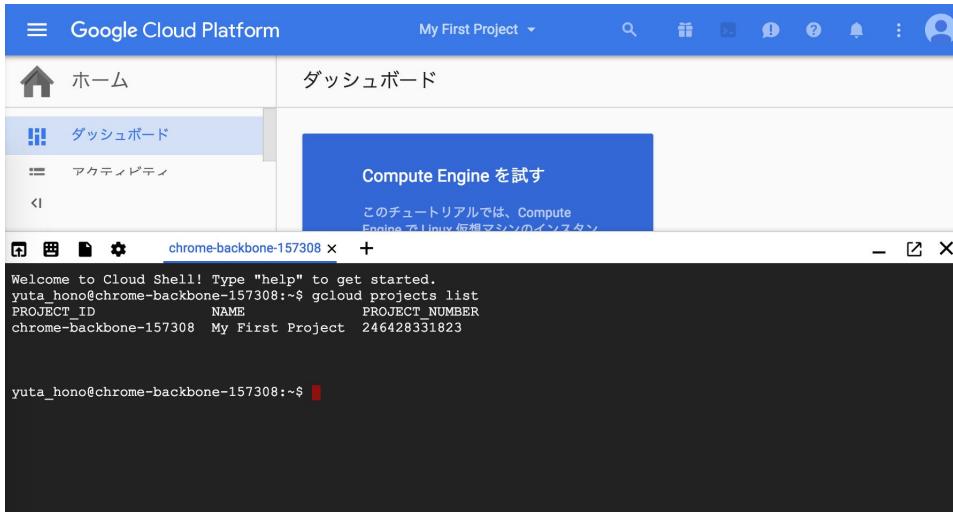


Let's Try Using Google Cloud Shell

Accessing the Cloud Shell:

- Console launches
- Project list is displayed

```
$ gcloud projects list
```



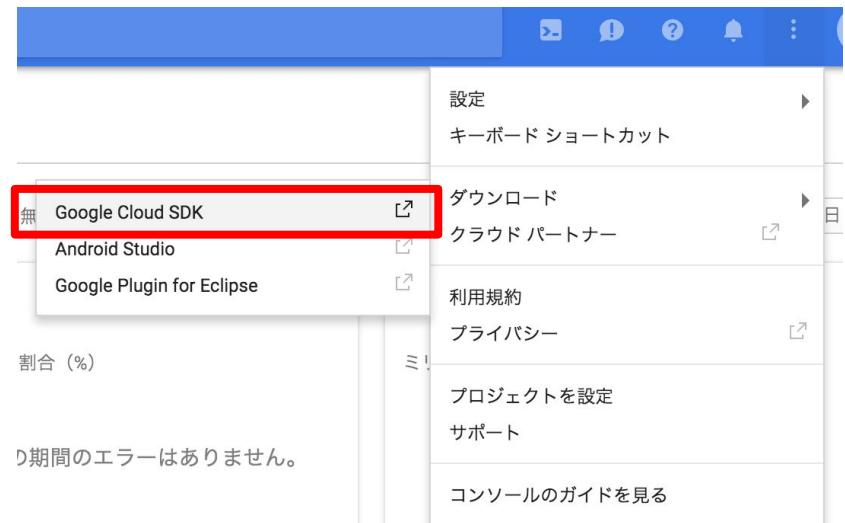
To proceed to the Cloud Shell without installing the command line tool:
[Jump to the CE section](#)

Installing the Command tool

Each GCP service provides a command tool together with the GUI management console.

See the following for the installation method

<https://cloud.google.com/sdk/>



Installing the Command Tool

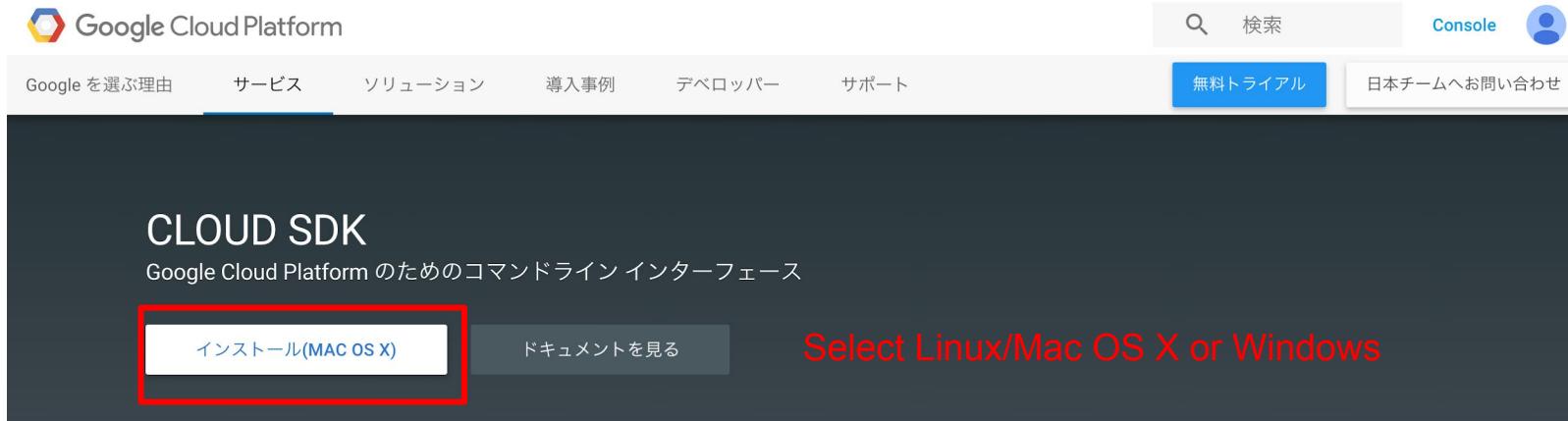
Google Cloud Platform

Google を選ぶ理由 サービス ソリューション 導入事例 デベロッパー サポート 無料トライアル 日本チームへお問い合わせ

CLOUD SDK

Google Cloud Platform のためのコマンドラインインターフェース

インストール(MAC OS X) ドキュメントを見る Select Linux/Mac OS X or Windows



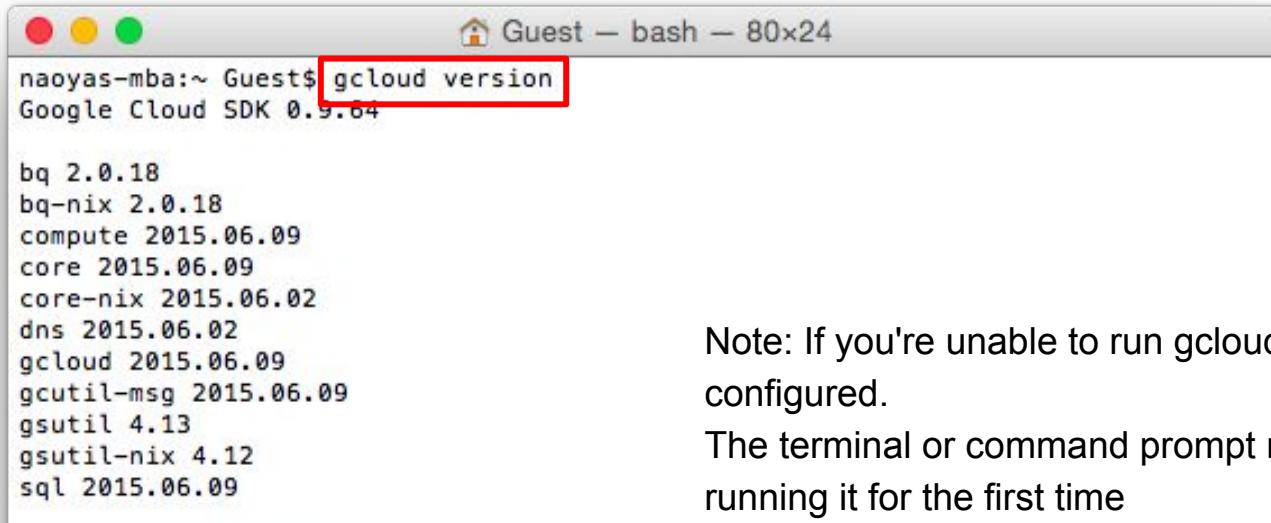
クラウド開発に不可欠なツール

Google Cloud Platform を利用する開発者に不可欠なツールの Google Cloud SDK では、Google Cloud Platform でのアプリケーションやサービスの構築を容易にするコマンドラインツール、ローカルエミュレーター、ライブラリが提供されています。gcloud コマンドは、シームレスなローカル認証と数多くのクラウド



Installing the Command Tool

\$ Check that it is properly installed with `gcloud version`



The screenshot shows a terminal window titled "Guest – bash – 80x24". The command `gcloud version` has been entered and its output is displayed. The output includes the Google Cloud SDK version (0.9.64) and various component versions: bq (2.0.18), bq-nix (2.0.18), compute (2015.06.09), core (2015.06.09), core-nix (2015.06.02), dns (2015.06.02), gcloud (2015.06.09), gcutil-msg (2015.06.09), gsutil (4.13), gsutil-nix (4.12), and sql (2015.06.09). The command `gcloud version` is highlighted with a red box.

```
naoyas-mba:~ Guest$ gcloud version
Google Cloud SDK 0.9.64

bq 2.0.18
bq-nix 2.0.18
compute 2015.06.09
core 2015.06.09
core-nix 2015.06.02
dns 2015.06.02
gcloud 2015.06.09
gcutil-msg 2015.06.09
gsutil 4.13
gsutil-nix 4.12
sql 2015.06.09
```

Note: If you're unable to run `gcloud`, check that the path is configured.
The terminal or command prompt must be restarted when running it for the first time

Installing the command tool

```
$ Perform the OAuth authentication  
with gcloud auth login
```

```
naoyas-mba:~ Guest$ gcloud auth login
Your browser has been opened to visit:
https://accounts.google.com/o/oauth2/auth?redirect_uri=https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform&prompt=select_account&response_type=code&client_id=654448871111-googleusercontent.com&scope=https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fappengine.admin+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcompute&access_type=offline
```



Installing the command tool

Configure the default project

```
$ gcloud config set project <project-id>
```

```
$ Check that it is properly configured with gcloud config list
```



```
naoyas-mba:~ Guest$ gcloud config set project gcpbeginner-project01
naoyas-mba:~ Guest$ gcloud config list
[core]
account = gcpbeginner@gmail.com
disable_usage_reporting = True
project = gcpbeginner-project01
naoyas-mba:~ Guest$
```

Reference: gcloud Commands

gcloud Command Tips

- Check the installed components
 - \$ gcloud components list
- Update the components
 - \$ gcloud components update
- Install (update) new components
 - \$ gcloud components update app-engine-python
- Delete the components
 - \$ gcloud components remove bq

Reference: gcloud Commands

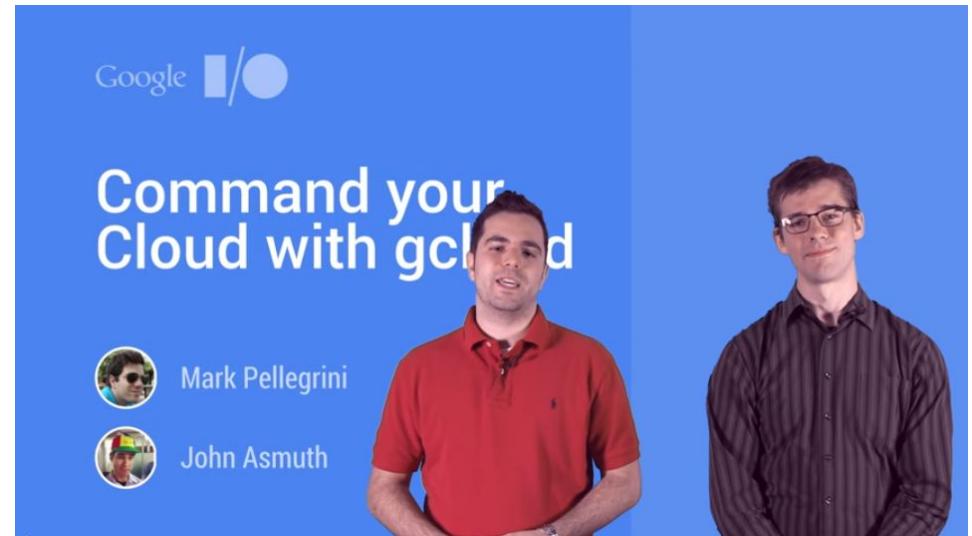
gcloud Command Tips (continued)

- **Checking the settings information**
 - `$ gcloud config list`
- **Changing a project**
 - `$ gcloud config set project <project id>`
- **Changing the Google account**
 - `$ gcloud auth login`
- **Setting the configuration properties**
 - `$ gcloud config set <property> <value>`
 - Ex: `$gcloud config set compute/zone asia-east1-b`
- **Resetting the configuration properties**
 - `$ gcloud config unset <property>`

Reference: gcloud Commands

gcloud command utilization video

<http://youtu.be/4y4-xn4Vi04>



Reference: Changing the Language Settings

Settings > Region specific display format

The screenshot shows the Google Developers Console interface. On the left, there's a sidebar with various navigation options like Overview, Permissions, API & Credentials, APIs, Authentication, Consent Screen, Push, Monitoring, Source Code, Deployment Manager, Compute Engine, Cloud Storage, Datastore, Deployment Manager, DNS, and BigQuery. The 'API & Credentials' section is currently selected.

In the main content area, there's a header bar with 'API ライブラリ' and '有効な API (6)'. Below it, there's a search bar with '100 件以上のすべての API を検索'. A red box highlights the '地域固有の表示形式' (Region-specific display format) link in the top right corner of this header.

On the right side, there's a sidebar with settings for the account, including 'ダウンロード', 'クラウド パートナー', '請求先アカウント', 'プロジェクト課金設定', '利用規約', 'プライバシー', 'プロジェクトの情報', and 'サポート'. The '設定' (Settings) link at the top of this sidebar is also highlighted with a red box.

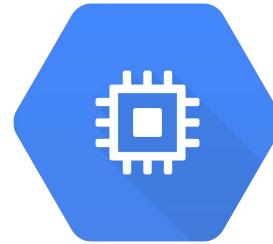
The bottom of the page lists several API categories with their respective icons and names:

- Google Cloud API**: Includes Compute Engine API, BigQuery API, Cloud Storage API, Cloud Datastore API, Cloud Deployment Manager API, Cloud DNS API, and more.
- Google Maps API**: Includes Google Maps Android API, Google Maps SDK for iOS, Google Maps JavaScript API, Google Places API for Android, Google Places API for iOS, Google Maps Roads API, and more.
- Mobile API**: Includes Cloud Messaging for Android, Google Play Game Services, Google Play Developer API, and more.
- Social API**: Includes Google+ API, Blogger API, Google+ Pages API, and more.
- YouTube API**: Includes YouTube Data API and YouTube Analytics API.

Reference: Changing the Language Settings



Compute Engine



Preparation

- ❑ The trial or billing must be enabled
 - ❑ If it is not enabled click [here](#)
- ❑ Cloud Shell or command line tool must be available for use
 - ❑ If the set up is not complete click [here](#)

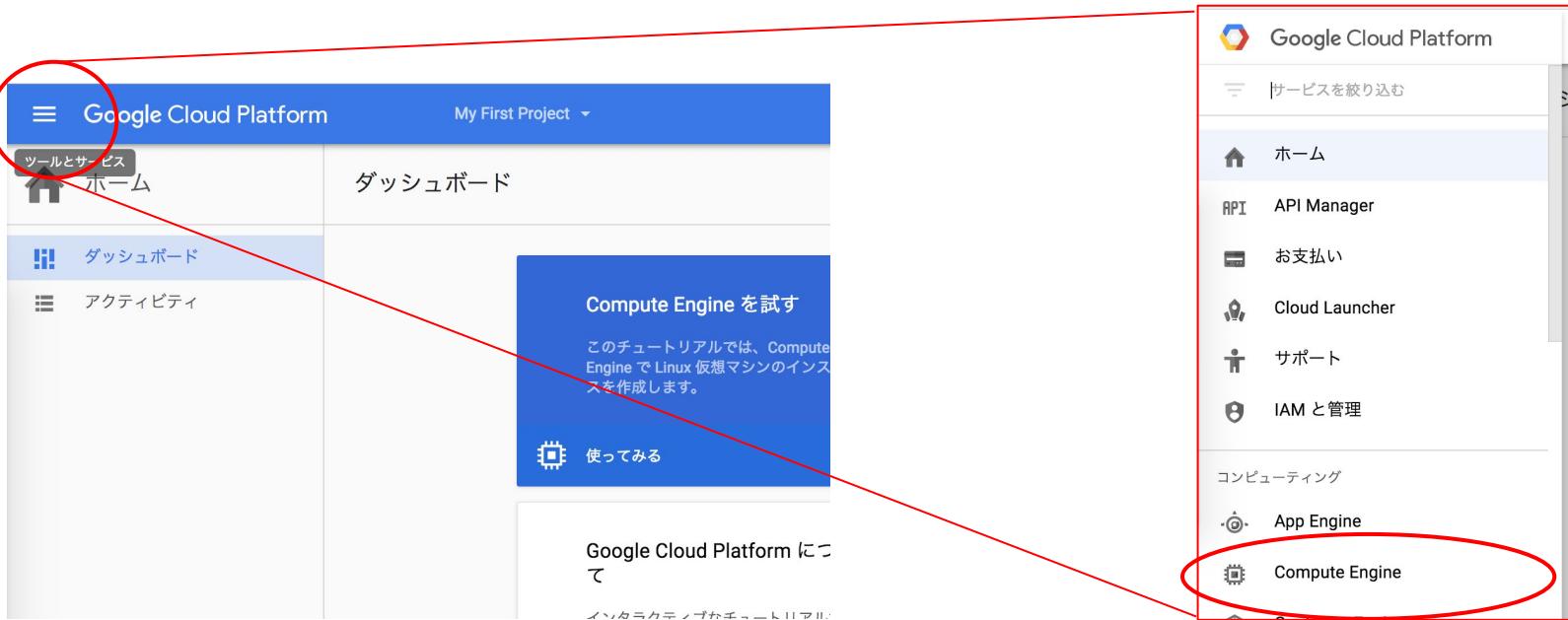
Launching a Web Server

Procedure overview

- Creating a VM instance
- Login
- Providing a web page
- Delete a VM instance

Accessing the Compute Engine Page

- Display the service list in the upper left of the Cloud Platform console



Creating a VM instance

- Select [Computing] > [Compute Engine] > [VM Instances] from the Cloud console
- (May take some time when performing for the first time)
- Click the [Create] or [Create Instance] button

<https://console.cloud.google.com/>



Creating a VM instance

- Enter the name of the instance (Ex: www1)
- Select the zone (Ex: asia-east1-c)

新しいインスタンスの作成

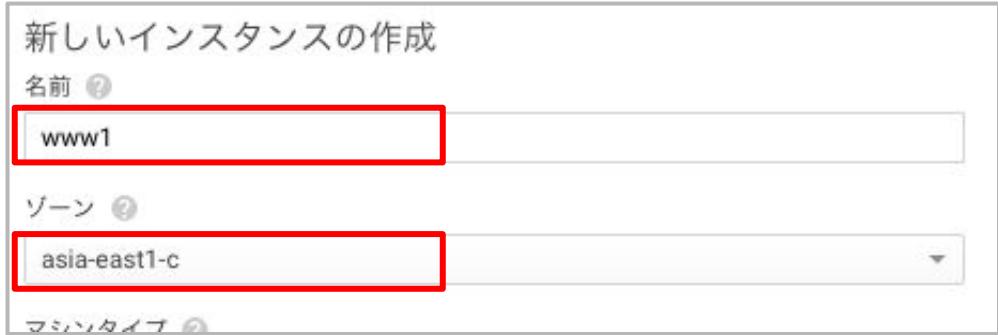
名前 ?

www1

ゾーン ?

asia-east1-c

マシンタイプ ?



Creating a VM instance

- Select the machine type
 - f1-micro (shared vCPU x1)
- Select the image
 - Debian
- Configure the firewall
 - Allow HTTP traffic
 - Allow HTTPS traffic

Check the checkboxes



Creating a VM instance

- Check the boot disk settings

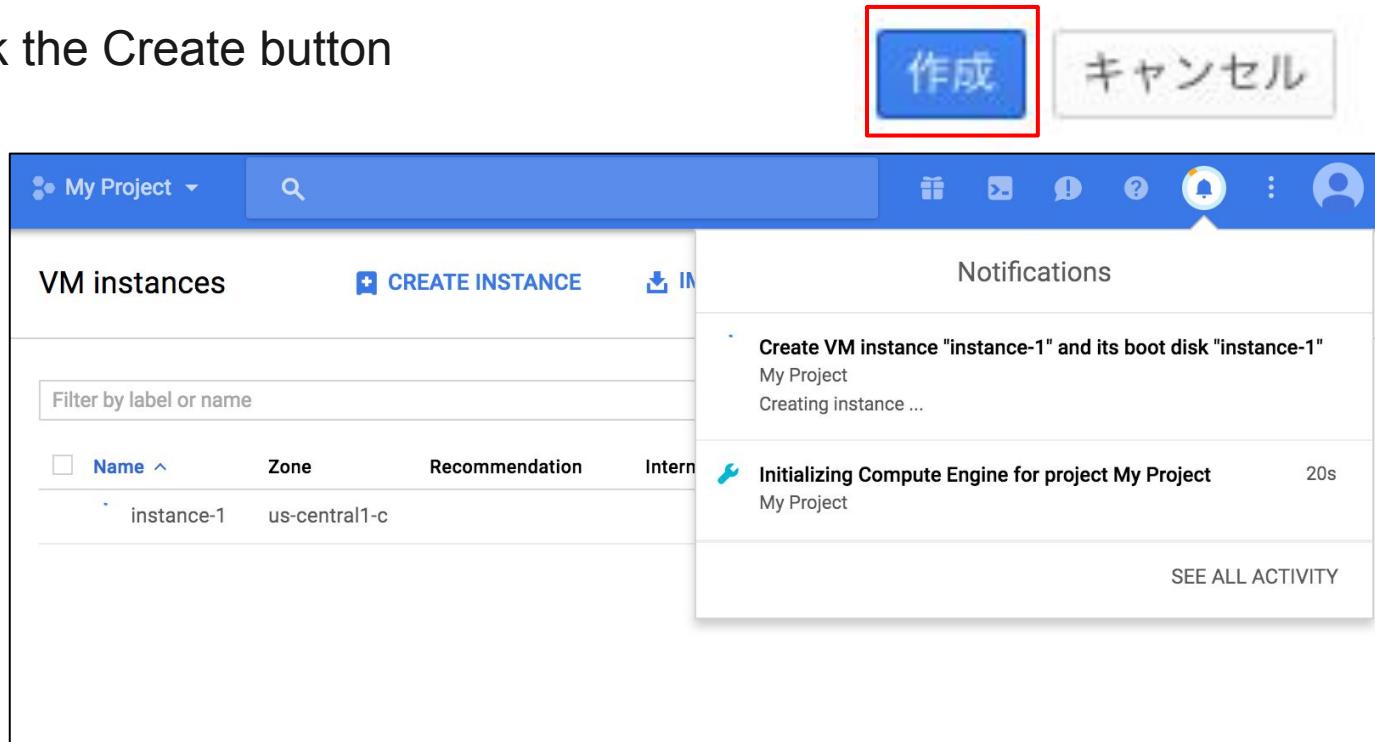
▼ Management, disk, networking, SSH keys



Check that "Delete boot disk when instance is deleted" is enabled by default

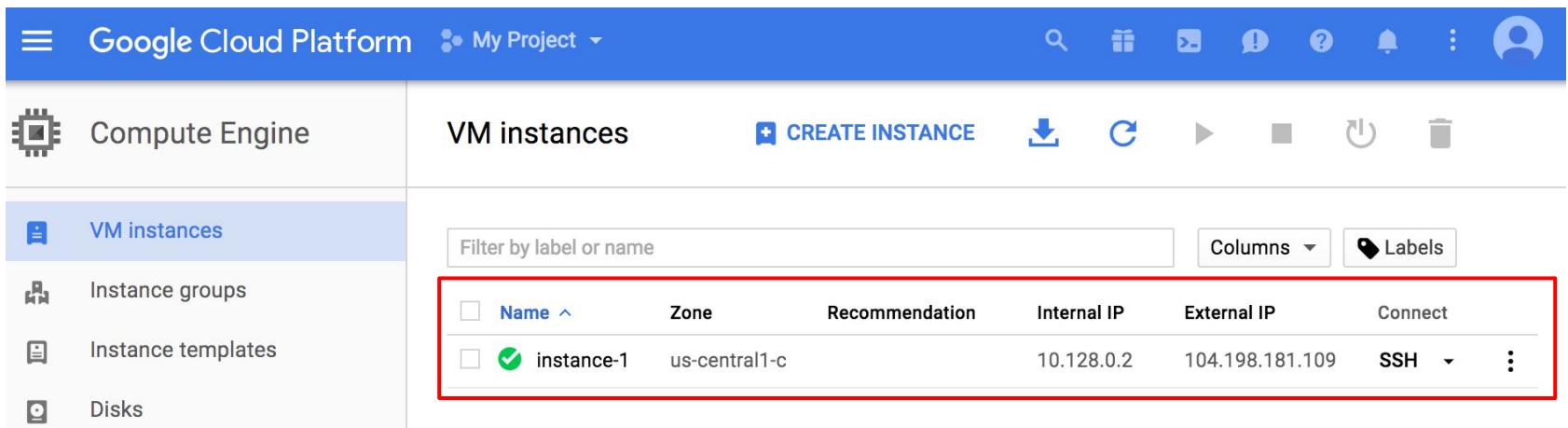
Creating a VM instance

Click the Create button



Creating a VM instance

Check that the VM instance was created under Compute Engine > VM instances



The screenshot shows the Google Cloud Platform interface for Compute Engine. The left sidebar has 'Compute Engine' selected, with 'VM instances' highlighted. The main area displays a table of VM instances. A red box highlights the first row, which contains the instance 'instance-1' in the 'Name' column, located in the zone 'us-central1-c'. The table also includes columns for Zone, Recommendation, Internal IP, External IP, Connect (with SSH options), and a more options menu.

Name	Zone	Recommendation	Internal IP	External IP	Connect	⋮
instance-1	us-central1-c		10.128.0.2	104.198.181.109	SSH	⋮

Logging in

There are multiple ways to log in to an instance.

Here we introduce two ways to log in.

- Log in from a web browser (Cloud Shell)
- Log in from a command prompt

Logging in(Browser)

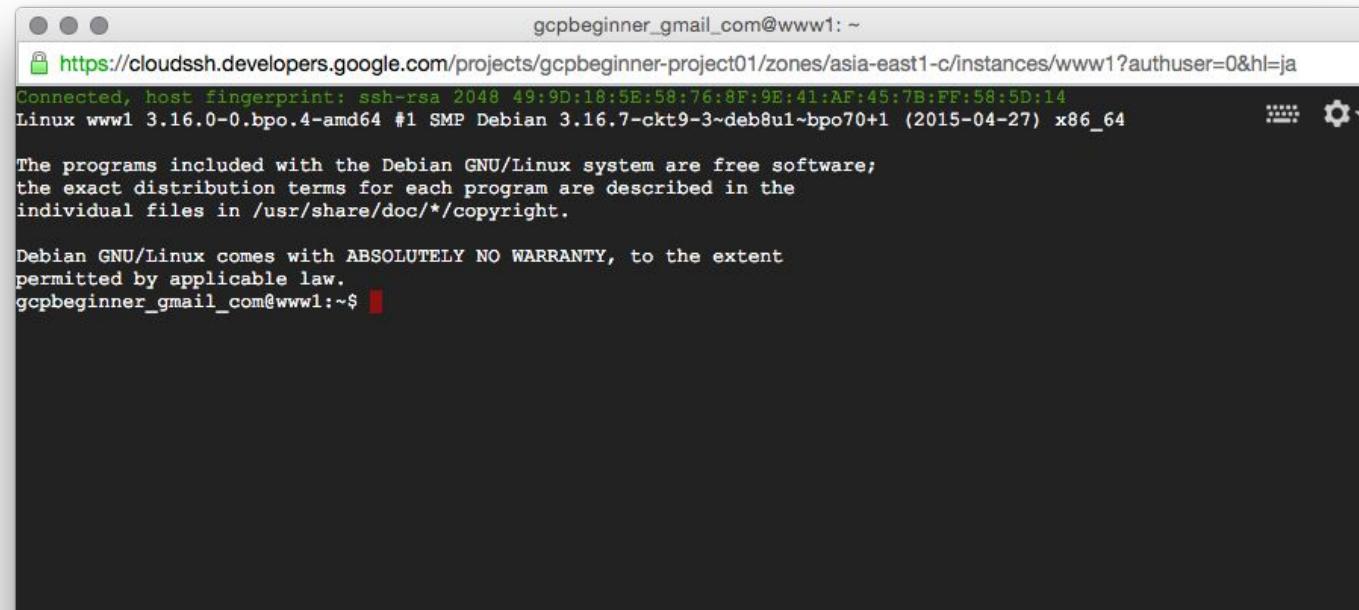
Log in with the SSH button

- Click the SSH button



Logging in(Browser)

Check that the console launches in a separate browser window



Logging In (Command)

- Search for the target instance row on the Instance List screen and click "View gcloud Commands" under the SSH button on the right side

The screenshot shows the Google Cloud Platform's Instance List screen. A table lists instances, with the first row selected ('www1'). To the right of the table is an 'SSH' button with a three-dot menu icon. A dropdown menu is open, listing four options:

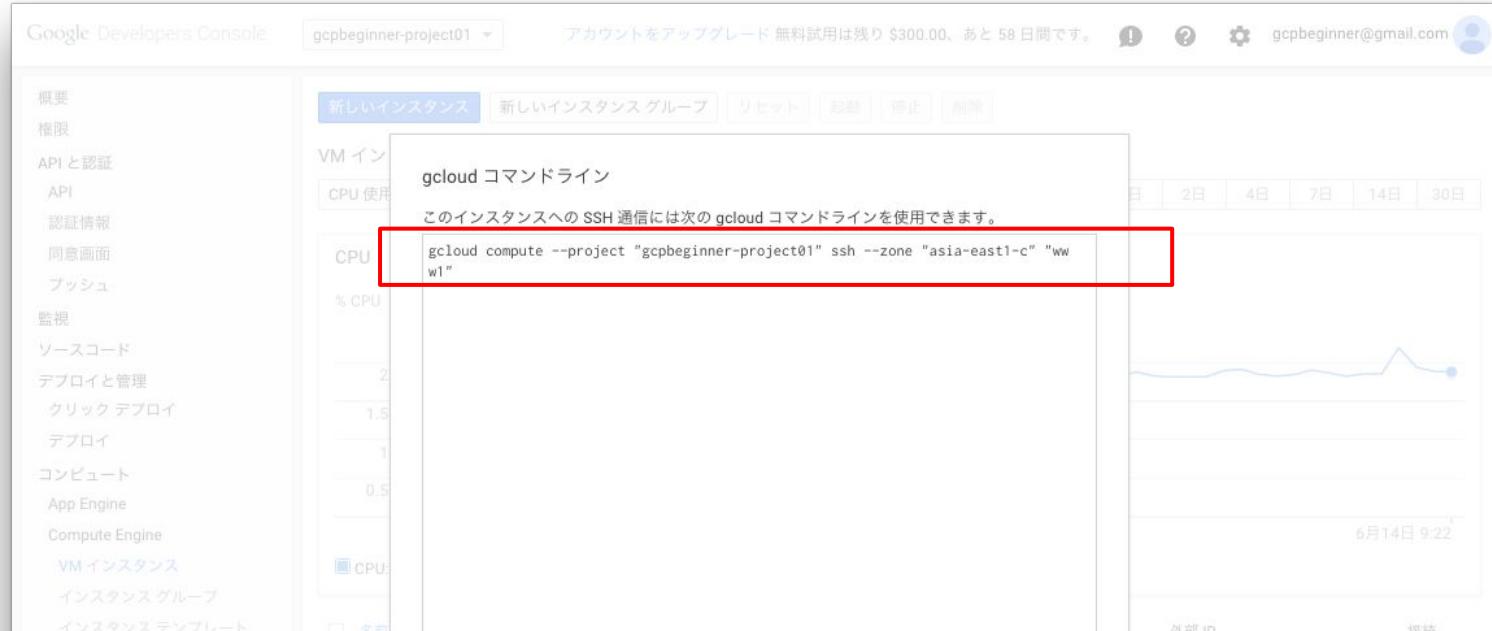
- ブラウザ ウィンドウで開く
- ブラウザ ウィンドウでカスタムポートを開く
- gcloud コマンドを表示** (This option is highlighted with a red rectangle.)
- 別の SSH クライアントを使用

A red arrow points from the bottom text "gcloud コマンドを表示" back up towards the "SSH" button.

名前	ゾーン	ディスク	ネットワーク	使用リソース	外部 IP	接続
www1	asia-east1-c	www1	default			<button>SSH</button> ⋮

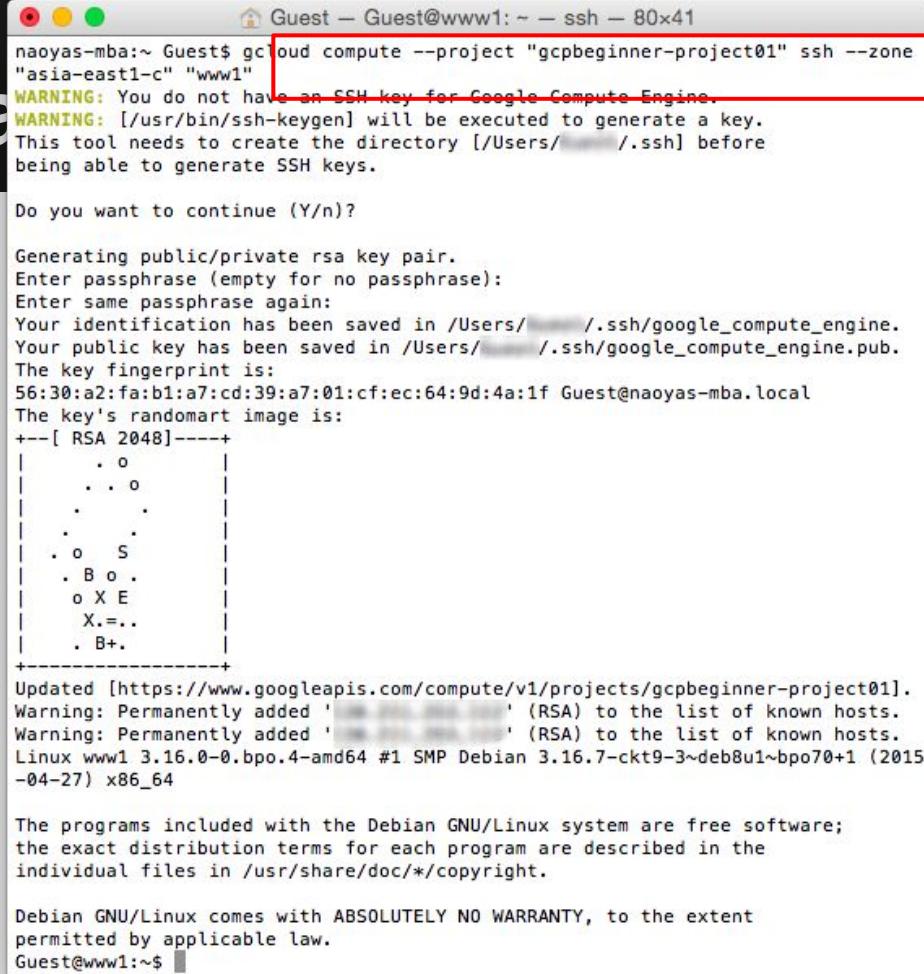
Logging In (Command)

- Copy the gcloud compute command line



Logging In (Command Line)

- Paste in the command prompt and run (SSH key generation process runs during the first time)



```
Guest - Guest@www1: ~ - ssh - 80x41
naoyas-mba:~ Guest$ gcloud compute --project "gcpbeginner-project01" ssh --zone
"asia-east1-c" "www1"
WARNING: You do not have an SSH key for Google Compute Engine.
WARNING: [/usr/bin/ssh-keygen] will be executed to generate a key.
This tool needs to create the directory [/Users/.../.ssh] before
being able to generate SSH keys.

Do you want to continue (Y/n)?
```

Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /Users/.../.ssh/google_compute_engine.
Your public key has been saved in /Users/.../.ssh/google_compute_engine.pub.
The key fingerprint is:
56:30:a2:fa:b1:a7:cd:39:a7:01:cf:ec:64:9d:4a:1f Guest@naoyas-mba.local
The key's randomart image is:
+--[RSA 2048]----+
| . o |
| .. o |
| . . |
| . . |
| . o S |
| . B o . |
| o X E |
| X.=.. |
| . B+. |
+-----+
Updated [https://www.googleapis.com/compute/v1/projects/gcpbeginner-project01].
Warning: Permanently added '...' (RSA) to the list of known hosts.
Warning: Permanently added '...' (RSA) to the list of known hosts.
Linux www1 3.16.0-0.bpo.4-amd64 #1 SMP Debian 3.16.7-ckt9-3~deb8u1~bpo70+1 (2015
-04-27) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Guest@www1:~\$

Providing a web page

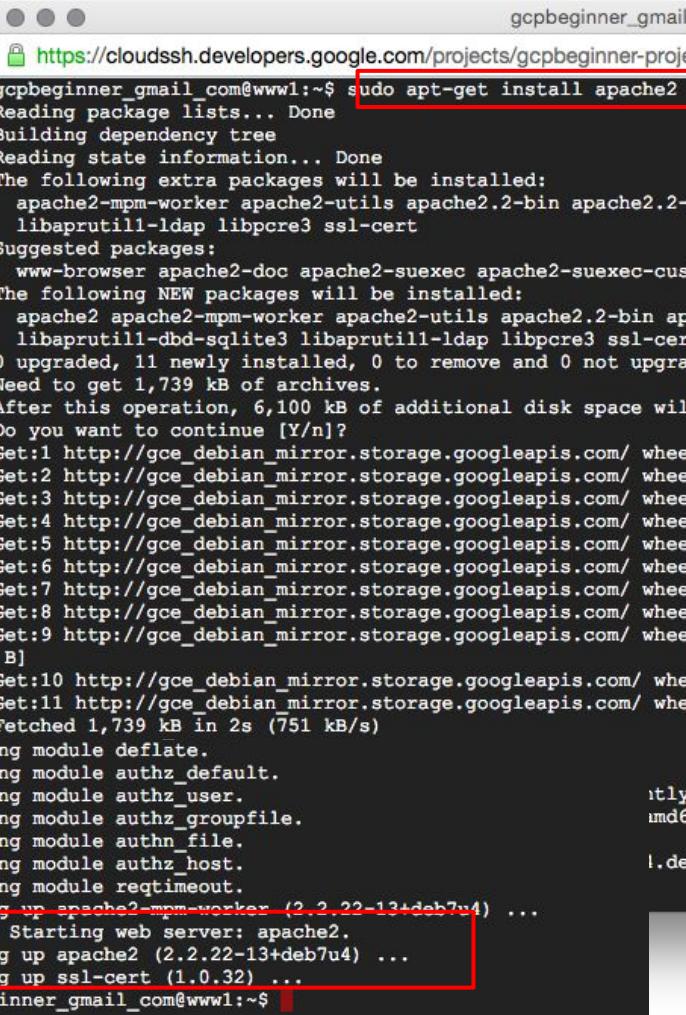
- Install the Apache Web server

Run the following two sudo commands

```
me@my-first-instance$ sudo apt-get update
```

```
me@my-first-instance$ sudo apt-get install apache2
```

...output omitted...



```
https://cloudssh.developers.google.com/projects/gcpbeginner-project
gcpbeginner_gmail_com@www1:~$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  apache2-mpm-worker apache2-utils apache2.2-bin apache2.2-common
    libaprutil1-ldap libpcre3 ssl-cert
Suggested packages:
  www-browser apache2-doc apache2-suexec apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-mpm-worker apache2-utils apache2.2-bin apache2.2-common
    libaprutil1-dbd-sqlite3 libaprutil1-ldap libpcre3 ssl-cert
0 upgraded, 11 newly installed, 0 to remove and 0 not upgraded
Need to get 1,739 kB of archives.
After this operation, 6,100 kB of additional disk space will be used.
Do you want to continue [Y/n]?
Get:1 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:2 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:3 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:4 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:5 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:6 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:7 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:8 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:9 http://gce_debian_mirror.storage.googleapis.com/ wheezy
  B]
Get:10 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Get:11 http://gce_debian_mirror.storage.googleapis.com/ wheezy
Fetched 1,739 kB in 2s (751 kB/s)
Enabling module deflate.
Enabling module authz_default.
Enabling module authz_user.
Enabling module authz_groupfile.
Enabling module authn_file.
Enabling module authz_host.
Enabling module reqtimeout.
Setting up apache2-mpm-worker (2.2.22-13+deb7u4) ...
[ ok ] Starting web server: apache2.
Setting up apache2 (2.2.22-13+deb7u4) ...
Setting up ssl-cert (1.0.32) ...
gcpbeginner_gmail_com@www1:~$
```

Creating a Web Page

- Create a web page (HTML file)
Copy and paste the following echo command to run it

```
$ echo "<html><body><h1>Hello World! running on  
`hostname`</h1></body></html>" | sudo tee  
/var/www/html/index.html
```

Creating a Web Page

- Check the external IP address on the VM Instances List screen
- Click the IP address link to access it with the browser



名前	ゾーン	ディスク	ネットワーク	使用リソース	外部 IP	接続
<input type="checkbox"/> www1	asia-east1-c	www1	default		192.168.1.13 	SSH 

Click and
change https to http

Hello World! running on www1

Deleting an Instance (Run at the End)

- Check the box to the left of the instance name that you wish to delete on the Instance List screen

名前 ^	ゾーン	ディスク	ネットワーク	使用リソース	外
<input checked="" type="checkbox"/> www1	asia-east1-c	www1	default		13

Deleting an Instance (Run at the End)

- Click the "Delete" button in the upper part of the Instance List screen



Compute Engine Reference URL (1/2)

- Online Man
 - <https://developers.google.com/compute/>
- Quick Start Guide
 - <https://developers.google.com/compute/docs/signup>
- Load balancer settings
 - [Network load balancer](#)
 - [HTTP load balancer \(cross region\)](#)
 - [HTTP load balancer \(content based\)](#)
- Docker on GCE
 - https://developers.google.com/compute/docs/containers/container_vms

Compute Engine Reference URL (2/2)

- Autoscaler
 - [Autoscaler](#)
- Support
 - Operation information (failures, planned shutdowns, etc.)
[gce-operations](#)
 - Discussion [gce-discussion](#)
 - [Security Bulletins](#)
 - Community ([Stack Overflow](#))
- Expenses
 - [Price list](#)
 - [Price calculation tool](#)

(Exercise 1) Communication Across Regions

Create a VM instance with the following configuration



1. Create www1 in the asia region and connect to the default network
2. Create www2 in the us region and connect to the default network
(same procedure as www1)

(Exercise 1) Communication Across Regions

1. Ping the VM instances (external IP addresses) in the Asia region and the US region from the local terminal to check the latencies

2. Log in to www1 via SSH and run the ping command on www2 (ping www2)
 - ✓ Check that the name is resolved
 - ✓ Check that it can be accessed with a private IP address even when spanning regions

(Exercise 2) Create a private network

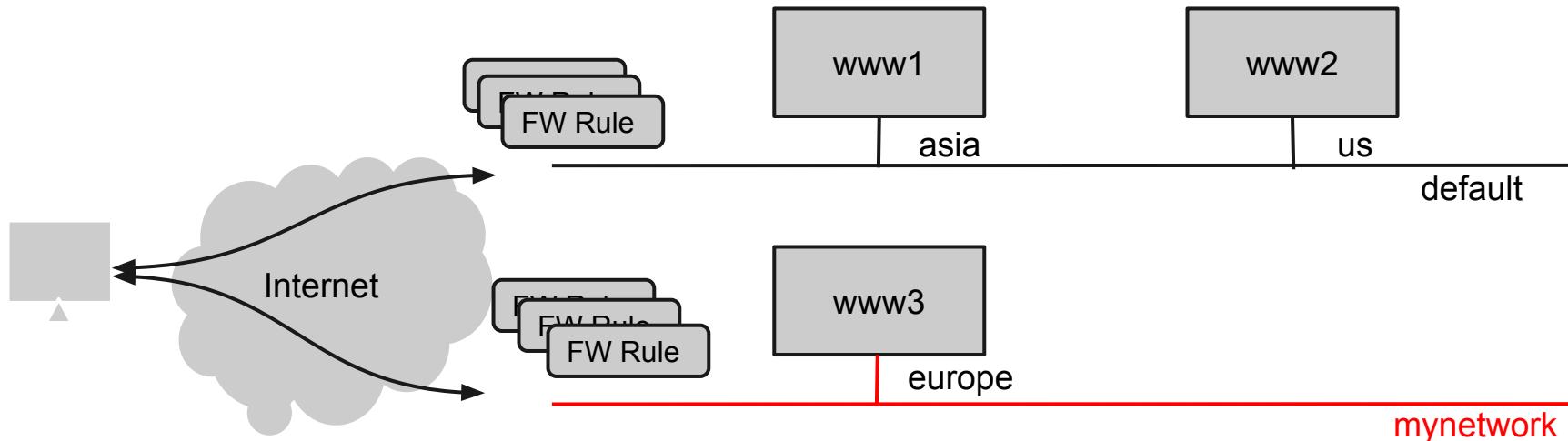
- You can select the network when creating the VM instance



Select the newly created
mynetwork

(Exercise 2) Create a private network

Create a private network.



(Exercise 2) Create a private network

The screenshot shows the AWS Management Console interface for creating a VPC network. On the left, a sidebar menu lists networking services: VPC networks (selected), External IP addresses, Firewall rules, Routes, Load balancing, Cloud DNS, VPN, and Cloud Router. The main area displays the 'VPC networks' page with a table of existing networks and a 'Create New VPC Network' button.

VPC networks

名前	リージョン	サブネット	モード	IP アドレス範囲	ゲートウェイ
default	us-central1	10	自動	10.128.0.0/20	10.128.0.1
	europe-west1	default		10.132.0.0/20	10.132.0.1

+ VPC ネットワークを作成

(Exercise 2) Create a private network

- Configure the network settings
 - Enter the network name
 - mynetwork
 - Select [Automatic] for the subnetwork
 - Check the firewall rules
 - Click [Create]



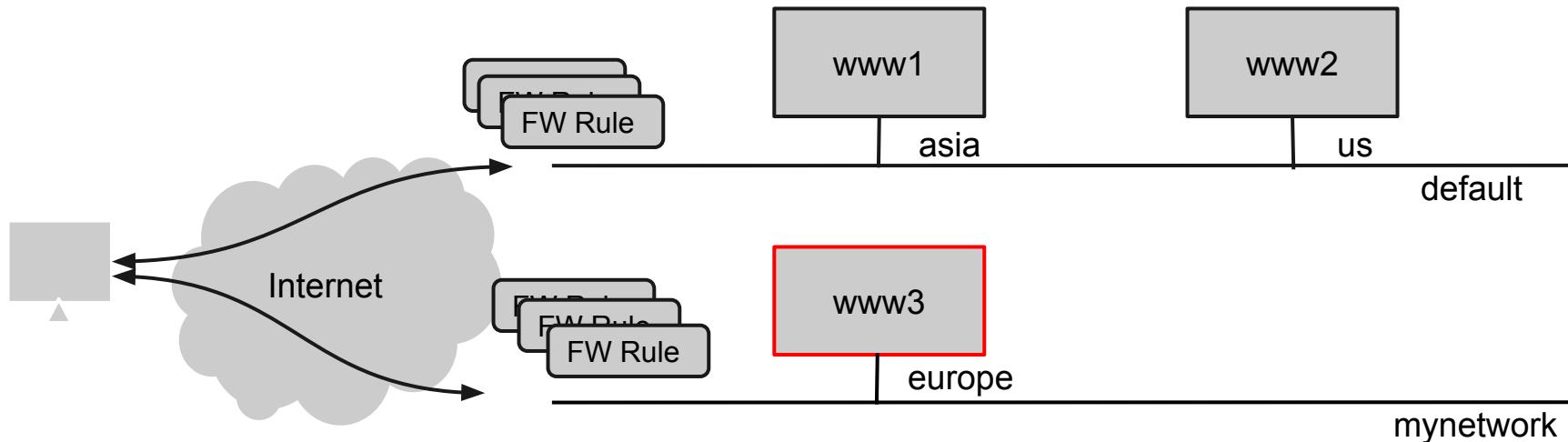
(Exercise 2) Create a private network

- Check that mynetwork was created

ネットワーク					
+ ネットワークを作成					
名前	地域	サブネットワーク	IP アドレス範囲	ゲートウェイ	ファイアウォール ルール
default		4		4	
	us-central1	default-89d6797f4848fd89	10.128.0.0/20	10.128.0.1	
	europe-west1	default-8512c169e2ffb300	10.132.0.0/20	10.132.0.1	
	asia-east1	default-65393cf7265f182e	10.140.0.0/20	10.140.0.1	
	us-east1	default-5757596c0fcf57fc	10.142.0.0/20	10.142.0.1	
mynetwork					
mynetwork		4		0	
	us-central1	mynetwork	10.128.0.0/20	10.128.0.1	
	europe-west1	mynetwork	10.132.0.0/20	10.132.0.1	
	asia-east1	mynetwork	10.140.0.0/20	10.140.0.1	
	us-east1	mynetwork	10.142.0.0/20	10.142.0.1	

(Exercise 2) Create a private network

Create a new instance called **www3** and connect it to **mynetwork**



(Exercise 2) Create a private network

1. Log in to www3 and ping www1

✓ Check that you cannot access with a private IP across networks

2. Log in to www3 and ping the public IP address of www1

✓ Check that you can access it with a public IP

(Exercise 3) Adding a Disk

Let's create a 500 GB disk so that we can add and use it with the VM instance.

The process overview is as follows.

- Create a permanent disk
- Attach the disk to the VM instances
- Format and mount
 - <https://cloud.google.com/compute/docs/disks/add-persistent-disk>

(Exercise 3) Adding a Disk

Select the target instance and click [Edit]

Click [+ Add Item] in the added disc section



(Exercise 3) Adding a Disk

Enter the permanent disk information.

- Name: Disk name
- Disk type: Standard permanent disk
- Source type: None (empty disk)
- Size: 500

Click the "Create" button

ディスクの作成

名前 説明 (省略可)

ディスクタイプ

ソースの種類 イメージ スナップショット なし (空のディスク)

サイズ (GB)

推定パフォーマンス

オペレーションタイプ	読み取り	書き込み
持続的なランダム IOPS の上限	150	750
持続的なスループットの上限 (MB/s)	60	45

暗号化

(Exercise 3) Adding a Disk

Check that the disk was added to the instance and then click Save



(Exercise 3) Adding a Disk

Log in to the VM instance

- \$ gcloud compute ssh <instance name>

(Exercise 3) Adding a Disk

Check the available disk capacity.

- \$ sudo df -h

```
fukudak@www1:~$ sudo df -h
Filesystem              Size  Used Avail Use% Mounted on
rootfs                  9.9G  655M  8.8G  7% /
udev                      10M    0   10M  0% /dev
tmpfs                     372M  116K  372M  1% /run
/dev/disk/by-uuid/a3864f53-b3b7-4a6d-9a27-548305aa6594  9.9G  655M  8.8G  7% /
tmpfs                     5.0M    0   5.0M  0% /run/lock
tmpfs                     743M    0   743M  0% /run/shm
-
```

Check that the attached disk is not available yet

(Exercise 3) Adding a Disk

Format and mount the disk.

- Create the mount point
 - `$ sudo mkdir <mount point>`

(Exercise 3) Adding a Disk

Check the disk name.

- Disk name check
 - \$ ls -l /dev/disk/by-id/google-*

```
fukudak@www1:~$ ls -l /dev/disk/by-id/google-*
lrwxrwxrwx 1 root root 9 Jun  2 00:14 /dev/disk/by-id/google-disk-1 -> ../../sdb
lrwxrwxrwx 1 root root 9 Jun  1 23:56 /dev/disk/by-id/google-www1 -> ../../sda
lrwxrwxrwx 1 root root 10 Jun  1 23:56 /dev/disk/by-id/google-www1-part1 -> ../../sda1
```

Currently added disk. Configured so the disk name can be identified

(Exercise 3) Adding a Disk

Format the disk

- Run the tool to format the disk
 - `$ sudo mkfs.ext4 -F -E
lazy_itable_init=0,lazy_journal_init=0,discard <disk-name>`

```
kobori@www1:/dev/disk/by-id$ sudo mkfs.ext4 -F -E lazy_itable_init=0,lazy_journal_init=0,discard /dev/disk/by-id/google-disk-1
mke2fs 1.42.12 (29-Aug-2014)
Discarding device blocks: done
Creating filesystem with 131072000 4k blocks and 32768000 inodes
Filesystem UUID: a41b537d-0928-4797-a38c-2e4292343e7a
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
    4096000, 7962624, 11239424, 20480000, 23887872, 71663616, 78675968,
    102400000

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

(Exercise 3) Adding a Disk

Mount the disk

- Run the tool to mount the disk
 - \$ sudo mount -o discard,defaults <disk-name> <mount-point>

```
kobori@www1:/dev/disk/by-id$ sudo mount -o discard,defaults /dev/disk/by-id/google-disk-1 /mnt/disks/disk1
kobori@www1:/dev/disk/by-id$ df -k
Filesystem      1K-blocks  Used Available Use% Mounted on
/dev/sda1        10188088  720056   8927464  8% /
udev             10240      0    10240   0% /dev
tmpfs            121744    4312   117432   4% /run
tmpfs            304352      0   304352   0% /dev/shm
tmpfs             5120      0     5120   0% /run/lock
tmpfs            304352      0   304352   0% /sys/fs/cgroup
/dev/sdb         515930552 71448 489628320  1% /mnt/disks/disk1
```

(Exercise 3) Adding a Disk

Check that the new disk is mounted and available.

- Check with the df command
 - \$ sudo df -h

```
fukudak@www1:~$ sudo df -h
Filesystem                      Size  Used Avail Use% Mounted on
rootfs                           9.9G  656M  8.8G  7% /
udev                             10M    0   10M  0% /dev
tmpfs                            372M  116K  372M  1% /run
/dev/disk/by-uuid/a3864f53-b3b7-4a6d-9a27-548305aa6594  9.9G  656M  8.8G  7% /
tmpfs                            5.0M    0   5.0M  0% /run/lock
tmpfs                            743M    0  743M  0% /run/shm
/dev/sdb                         493G 198M 467G 1% /data
```

(Exercise 4) Stackdriver

Set up Stackdriver to check the logs and metrics

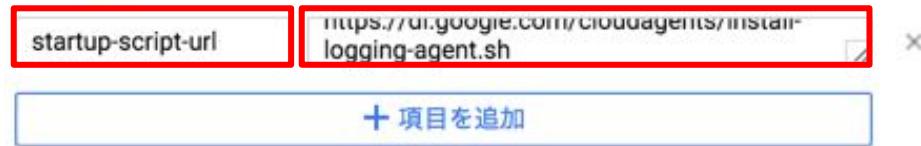
<https://cloud.google.com/monitoring/quickstart-lamp>

[Optional] Logging Agent

- Logging agent configuration
 - Manage > Metadata
 - Key:
startup-script-url
 - Value:
<https://dl.google.com/cloudagents/install-logging-agent.sh>

メタデータ (省略可)

サーバー定義メタデータの対象外のインスタンスやプロジェクトにカスタム メタデータを設定できます。カスタム メタデータは、プロジェクトやインスタンスに任意の値を渡して、これに対してインスタンス上のコードでクエリを実行できるようにする場合に有用です。[詳細](#)



The screenshot shows a configuration interface for custom metadata. It features two input fields: one for the key 'startup-script-url' containing the value 'https://dl.google.com/cloudagents/install-logging-agent.sh'. Both the key and the value fields are highlighted with a red border. Below these fields is a blue button labeled '+ 項目を追加' (Add item).

startup-script-url	<input type="text" value="https://dl.google.com/cloudagents/install-logging-agent.sh"/>
--------------------	---

+ 項目を追加

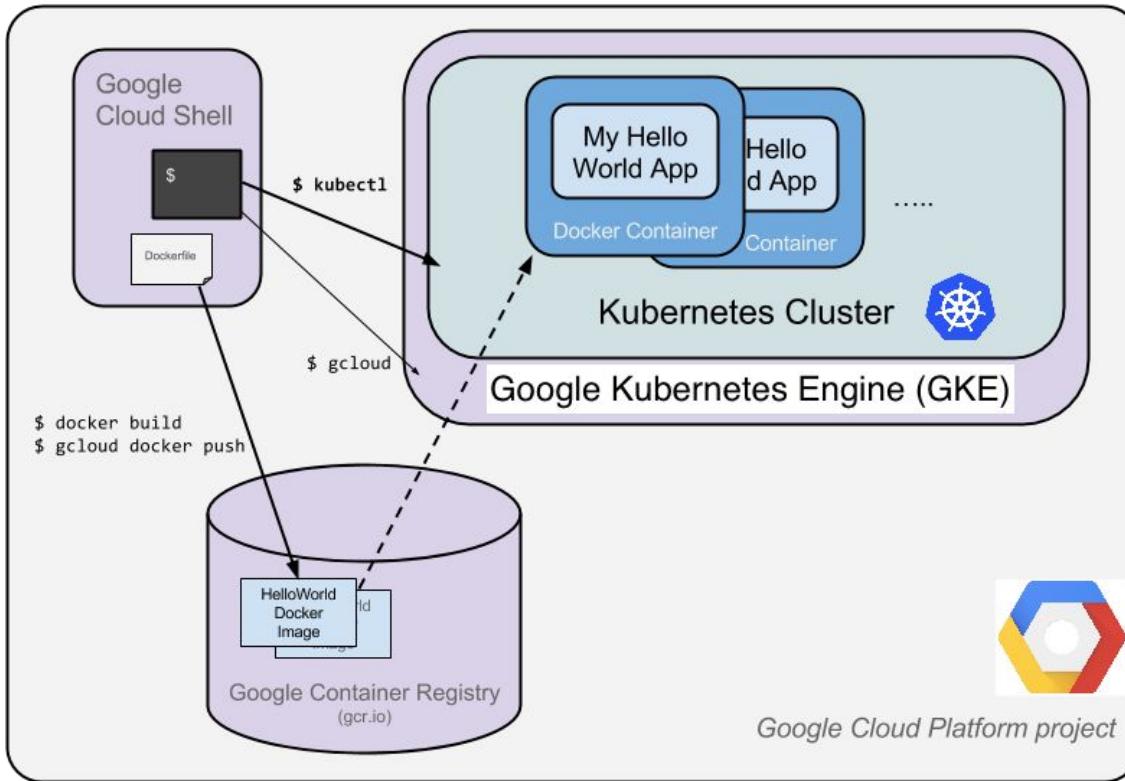
Kubernetes Engine



Preparation

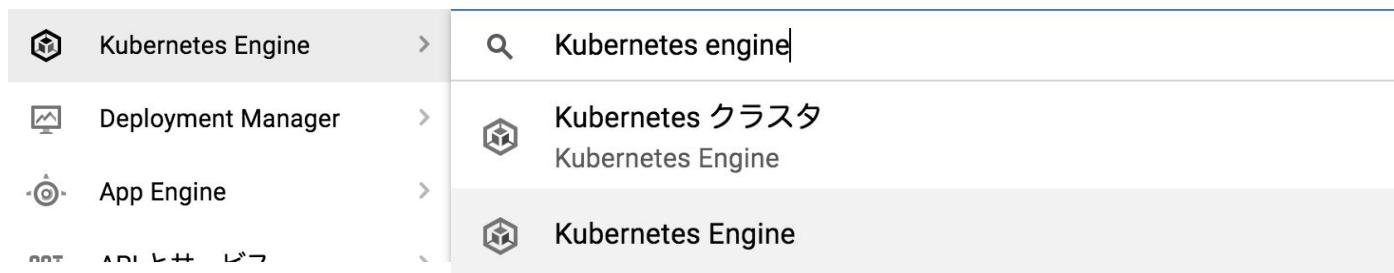
- ❑ A Google Cloud Platform project must be created
 - ❑ If it has not been created, click [here](#)
- ❑ Billing must be activated
 - ❑ If it is not enabled, click [here](#)
- ❑ "Google Container Engine API", "Google Compute Engine" and their related APIs are enabled
 - ❑ If they are not enabled, click [here](#)

Environment



Create a Cluster

Select Management Console> [Kubernetes Engine]



Create a Cluster

Click the [Create Container Cluster] button



Create a Cluster

Enter the container cluster information and click the "Create" button

- Name : "cluster-1"
- Zone: "asia-east1-a"
- Machine type: "vCPU x 1"
- Size (number of nodes in cluster): "3"
- Subnetwork: "default"
- Check "Turn on Stackdriver Logging"

The screenshot shows the 'Create a Container Cluster' form. The fields filled in are:

- 名前: cluster-1
- 説明 (省略可): (empty)
- ゾーン: asia-east1-a
- マシンタイプ: vCPU x 1 (メモリ: 3.75 GB, カスタマイズ)
- サイズ: 3
- 合計コア数: vCPU 3 個
- 合計メモリ: 11.25 GB
- サブネットワーク: default
- Logging and monitoring:
 - Turn on Stackdriver Monitoring
To use Stackdriver Monitoring for instances, enable Stackdriver Monitoring for your project ↗
 - Turn on Stackdriver Logging

Create a Cluster

Check that container cluster has been created
(It will take several minutes to be created)

コンテナ クラスタ

<input type="checkbox"/> 名前	ゾーン	クラスタサイズ	合計コア数	合計メモリ	ノードのバージョン		
<input checked="" type="checkbox"/> cluster-1	asia-east1-a	3	vCPU 3 個	11.25 GB	1.3.3		

Launch Google Cloud Shell

Launch [Google Cloud Shell] from [Management Console](#)

- Click the icon in the upper right



```
fukudak-ocean ~$
```

Welcome to Cloud Shell! For help, visit <https://cloud.google.com/cloud-shell/help>.

The screenshot shows the Google Cloud Shell interface. At the top, there are icons for file operations (copy, paste, refresh, settings) and a tab labeled 'fukudak-ocean'. Below the tabs is a terminal window with the following text:
Welcome to Cloud Shell! For help, visit <https://cloud.google.com/cloud-shell/help>.
fukudak@fukudak-ocean:~\$

Install the kubectl Command

Execute the following command in [Google Cloud Shell]

```
$ sudo /google/google-cloud-sdk/bin/gcloud components update kubectl
```

TIPS: You can obtain a list of installed components by executing the gcloud components list command.

Configure the Command Environment

Execute the following commands to configure the command execution environment.

```
$ export PROJECT_ID = <project id> # Set Project ID
$ gcloud config set project ${PROJECT_ID}
$ gcloud config set compute/zone asia-east1-a # <zone>
$ gcloud config set container/cluster cluster-1 # <cluster name>
$ gcloud container clusters get-credentials cluster-1 # <cluster name>
```

Create Application

Create directory for application

```
$ mkdir helloNode  
$ cd helloNode
```

Create Application

Save the following file with the name server.js.

```
var http = require('http');

var handleRequest = function(request, response) {
    var os = require ('os');
    var hostname = os.hostname();
    response.writeHead(200);
    response.end("<h1>Hello World! == " + hostname + "</h1>\n");
}

var www = http.createServer(handleRequest);
www.listen(8080);
```

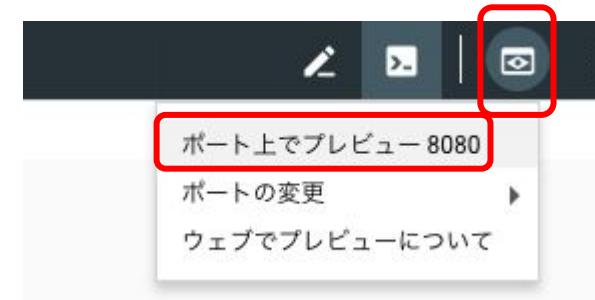
A simple web application that outputs "Hello World!" and the host name.

Confirm the Application Execution

Execute the following command

```
$ node server.js
```

Check that a message is output by curl localhost: 8080 from another console (or "Preview on port")



Close the server process by pressing Ctrl-C

Create a Docker Container Image

Save the following file with the name Dockerfile.

```
FROM node:6.9
EXPOSE 8080
COPY server.js /server.js
CMD node server.js
```

Create a Docker Container Image

Build the Docker image.

```
$ docker build -t asia.gcr.io/${PROJECT_ID}/hello-node:v1 .
```

```
Sending build context to Docker daemon 3.072 kB
Step 1 : FROM node:0.12
0.12: Pulling from library/node

523ef1d23f22: Extracting [=====] 34.6 MB/51.35 MB
140f9bdfeb97: Download complete
5c63804eac90: Download complete
ce2b29af7753: Download complete
5c2bdca41b86: Downloading [=====] 114.6 MB/128.6 MB
f417df1119e6: Download complete
d36821cb651a: Download complete
48d9fce985a8: Download complete
d09c6f7639f7: Download complete
```

It will take several minutes for the build to complete.

Create a Docker Container Image

Push to Google Container Registry. (It will take some time the first time)

```
$ gcloud docker -- push asia.gcr.io/${PROJECT_ID}/hello-node:v1
```

Check that Push to the Google Container Registry has completed.

```
$ gcloud container images list-tags asia.gcr.io/${PROJECT_ID}/hello-node
```

Check the Docker Container Registry

Console> Tools> Container Registry

The screenshot shows the Container Registry interface. On the left, there's a sidebar with three items: 'Container Registry' (selected), 'トリガーを作成' (Create Trigger), and 'ビルド履歴' (Build History). The main area has a header with a back arrow, the title 'Container Registry', and buttons for '更新' (Update), download, and delete. Below the header, the URL 'asia.gcr.io / [REDACTED] / hello-node' is shown. There's a search bar with the placeholder '名前またはタグでフィルタ' (Filter by name or tag) and a '列' (Columns) dropdown. A table lists one item:

名前	タグ	仮想サイズ	アップロード済み
bff3700ef47b	v1	247.8 MB	14 分前

Exercise: Docker Container Basics

Exercise 1. Execute the created Docker container from Cloud Shell

```
$ docker images
```

```
$ docker run -d -p 8080:8080 asia.gcr.io/${PROJECT_ID}/hello-node:v1
```

```
$ curl localhost:8080
```

```
$ docker ps
```

```
$ docker kill <container id>
```

```
$ docker rm <container id>
```

Create Deployment

Save the following with the filename hello-node-deployment.yaml.

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  labels:
    name: hello-node
  name: hello-node
spec:
  replicas: 1
  template:
    metadata:
      labels:
        name: hello-node
    spec:
      containers:
        - image: asia.gcr.io<project id>/hello-node:v1  # Rewrite Project ID
          name: hello-node
        ports:
          - containerPort: 8080
```

Create Deployment

Create Deployment using the kubectl create command.

```
$ kubectl create -f hello-node-deployment.yaml
```

Check the created Deployment and Pod.

```
$ kubectl get deployment  
$ kubectl get pods -o wide
```

Exercise

Exercise 1. Log in to the Node where Pod is running and check that the Docker container is running.

Exercise 2. Delete the active Docker container. Check what happens.

Create Service

Save the following as hello-node-service.yaml.

```
apiVersion: v1
kind: Service
metadata:
  labels:
    name: hello-node
  name: hello-node
spec:
  ports:
  - port: 8080
  selector:
    name: hello-node
  type: LoadBalancer
```

Create Service

Create the Service using the kubectl create command.

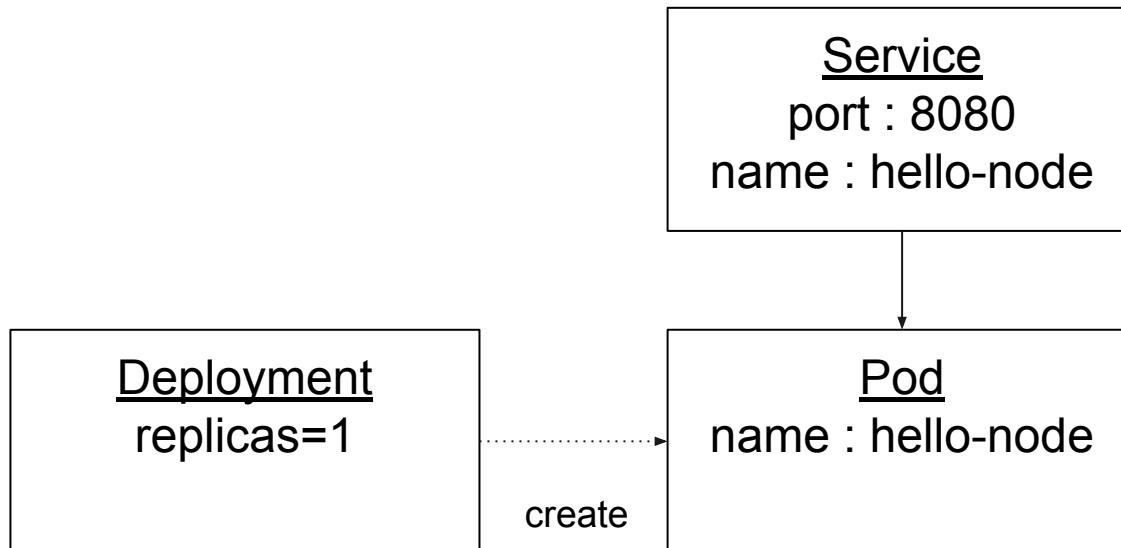
```
$ kubectl create -f hello-node-service.yaml
```

Check the created service.

```
$ kubectl get svc
```

Since a network load balancer is created, it takes some time for the external IP address to be allocated.

Configuration up to this Point



Test Execution

Check the external IP address of the service.

```
$ kubectl get svc
```

Use the curl command to access and check the output.
(It can also be accessed by a web browser)

```
$ curl <EXTERNAL IP>:8080
```

Scale-out the Pod

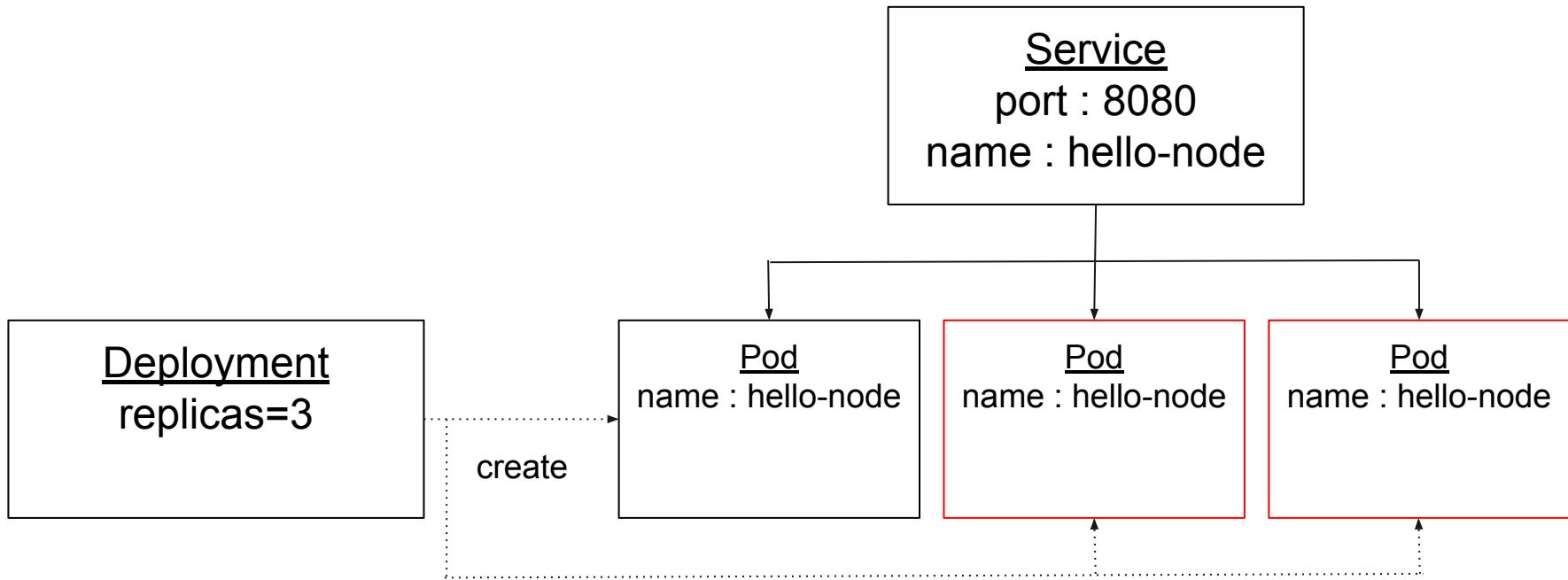
You can change the number of pod replicas using the kubectl scale command.

```
$ kubectl scale deployment/hello-node --replicas=3
```

Check the number of pods.

```
$ kubectl get pods -o wide
```

Configuration up to this Point



(Exercise) Version Change

1. Change message output by application (server.js)
2. Build the Docker image and make it v2
3. Register new version in registry with Docker push
4. Change image with kubectl edit deployments/hello-node
5. Check that the version changes with kubectl describe deployments/hello-node

Cleanup - Kubernetes Component

Delete the service.

```
$ kubectl delete svc/hello-node
```

Delete the deployment.

```
$ kubectl delete deployment/hello-node
```

Cleanup - GKE Cluster

Delete the cluster.

コンテナ クラスタ

+ クラスタを作成

削除

コンテナ クラスタ

<input type="checkbox"/> 名前	ゾーン	クラスタサイズ	合計コア数	合計メモリ	ノードのバージョン
<input checked="" type="checkbox"/> cluster-1	asia-east1-a	3	vCPU 3 個	11.25 GB	1.3.3



Click the delete icon

Cleanup - Container Registry

Select Management Console > Storage(GoogleCloudStorage).

Select bucket name `asia.artifacts.<project id>.appspot.com` and click the delete button



NOTE: kubectl Command

- Check stdout/stderr of Pod

```
$ kubectl logs <POD_NAME>
```

- Check cluster meta information

```
$ kubectl cluster-info
```

- Check the status of Pod

```
$ kubectl describe pods/<pod name>
```



App Engine (Python)

[Click Here for App Engine \(Java\) Edition](#)

Preparation

- ❑ A Google Cloud Platform project must be created
 - ❑ If it has not been created, click [here](#)
- ❑ Prepare one working virtual machine
 - ❑ If it has not been created, click [here](#)

Launch Google Cloud Shell

Launch [Google Cloud Shell] from [Management Console](#)

- Click the icon in the upper right



```
Welcome to Cloud Shell! For help, visit https://cloud.google.com/cloud-shell/help.  
fukudak@fukudak-ocean:~$
```

Create Code (acquired with git command)

Acquire code from github (when using git command)

- Execute the following command on Cloud Shell

```
$ git clone https://github.com/GoogleCloudPlatform/python-docs-samples
```

Create Code

Move to the folder in which git clone was executed

```
$ cd python-docs-samples/appengine/standard/hello_world  
$ ls  
app.yaml main.py main_test.py
```

Creating code

Check the contents of app.yaml (configuration file)

```
$ vi app.yaml
```

Creating code

GNU nano 2.2.6

File: app.yaml

```
runtime: python27
api_version: 1
threadsafe: true

handlers:
- url: /.*
  script: main.app
```

Close with Ctrl X

Creating code

Check the code of main.py.

```
$ vi main.py
```

Creating code

GNU nano 2.2.6

File: main.py

```
# Copyright 2016 Google Inc.
#
# Licensed under the Apache License, Version 2.0 (the "License");
# you may not use this file except in compliance with the License.
# You may obtain a copy of the License at
#
#     http://www.apache.org/licenses/LICENSE-2.0
#
# Unless required by applicable law or agreed to in writing, software
# distributed under the License is distributed on an "AS IS" BASIS,
# WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
# See the License for the specific language governing permissions and
# limitations under the License.

import webapp2

class MainPage(webapp2.RequestHandler):
    def get(self):
        self.response.headers['Content-Type'] = 'text/plain'
        self.response.write('Hello, World!')

app = webapp2.WSGIApplication([
    ('/', MainPage),
], debug=True)
```

Perform a Local Test

- Use the `dev_appserver.py` command to test the code in the local environment.

```
$ dev_appserver.py .
```

- Check that the default module started on the 8080 port of localhost.

```
$ dev_appserver.py .
INFO 2016-02-29 07:23:56,212 devappserver2.py:769] Skipping SDK update check.
INFO 2016-02-29 07:23:56,253 api_server.py:205] Starting API server at: http://localhost:52234
INFO 2016-02-29 07:23:56,257 dispatcher.py:197] Starting module "default" running at: http://localhost:8080
INFO 2016-02-29 07:23:56,259 admin_server.py:116] Starting admin server at: http://localhost:8000
```

Performing a local test

- Using Cloud Shell's Web Preview function, access the local (Cloud Shell) 8080 port and check that “Hello World” is displayed



Deploy to AppEngine

- (If you are running Dev server, close it with "Ctrl + C")
- Deploy to App Engine using the `gcloud app deploy` command

```
$ pwd  
~/python-docs-samples/appengine/standard/hello_world  
  
$ gcloud app deploy
```

Deploying to AppEngine

- See Console > App Engine > Version
- Click on the version name you just deployed
- Check that "Hello World" is displayed on the web browser

The screenshot shows the Google Cloud Platform App Engine Versions page. On the left, there's a sidebar with icons for Home, API, Services, Versions, Instances, Task Queue, Security Scan, Quotas, Blobstore, Memcache, Search, and Settings. The main area has tabs for App Engine, Versions, and Deployments. Under the Versions tab, there are buttons for Refresh, Delete, Stop, Start, Move Traffic, and Split Traffic. A dropdown menu for Service is set to 'default'. The table lists three versions:

バージョン	サービス	ステータス	トラフィック割り当て	インスタンス	ランタイム	環境	サイズ	デプロイ
20161007t053239	default	提供中	100%	1	python27	標準	2 KB	2016/10/07 5:32:57 (fukudak@google.com)
20160713t073222		提供中	0%	1	python27	標準	1.4 MB	2016/07/13 16:32:33 (fukudak@google.com)
20160603t191542		提供中	0%	0	python27	標準	24.5 KB	2016/06/03 19:16:00 (fukudak@google.com)

(Exercise 1) Version Control

Change the message output by the application and try deploy it as a new version.

1. Change the message output by main.py
2. Deploy using the gcloud app deploy --no-promote command
3. Check that the new version is deployed in the console version
4. Check the application

(Exercise 1) Version Control

Try version control while stressing the application

1. Execute the following command from Cloud Shell

```
$ while true; do curl <project-id>.appspot.com; echo; done
```

2. Adjust by splitting Version> traffic

Change "criterion of traffic split" to "cookie"

(Exercise 1) Version Control

App Engine

← トライフィックを分割

ダッシュボード

サービス

バージョン

インスタンス

タスクキュー

セキュリティスキャン

割り当て

Blobstore

Memcache

受信トライフィックを複数のバージョンのアプリに分割することができます。トライフィックの分割は、新しいバージョンを時間をかけて公開する場合や、デザインや機能の A/B テストを行う場合に役立ちます。 詳細

トライフィック分割の基準 ②
 IP アドレス
 Cookie Set to Cookie base.

トライフィック割り当て
20161011t143203 は、残り 50% のトライフィックを受信します

20161007t054045 50 % X

+ バージョンを追加

保存 キャンセル



(Exercise 2) Check Auto Scale

Check that the server instance automatically scales with loading of the application

1. (On Cloud shell) \$ sudo apt-get install apache2-utils
2. ab -n 1000 -c 100 -t 30 http://<project-id>.appspot.com/
3. Check the number of instances from Console> AppEngine> Instance

(Exercise 2) Check Auto Scale



(Exercise 2) Check Auto Scale

インスタンス (自動的に追加 / 削除) ?

<input type="checkbox"/>	QPS 過去1分	レイテンシ 過去1分	リクエスト数	エラー数	メモリ	開始時間	ログ	可用性
<input type="checkbox"/>	16.133	2ミリ秒	7221	0	30 MB	2016/10/07 5:46:02	表示	ダイナミック
<input type="checkbox"/>	16	1ミリ秒	2553	0	21.9 MB	2016/10/07 6:06:46	表示	ダイナミック
<input type="checkbox"/>	16.35	4ミリ秒	2536	0	29.8 MB	2016/10/07 6:06:46	表示	ダイナミック
<input type="checkbox"/>	15.817	1ミリ秒	2528	0	27.8 MB	2016/10/07 6:06:46	表示	ダイナミック
<input type="checkbox"/>	15.883	2ミリ秒	2520	0	13.8 MB	2016/10/07 6:06:46	表示	ダイナミック
<input type="checkbox"/>	0.1	8ミリ秒	2451	0	27.9 MB	2016/10/07 6:06:32	表示	ダイナミック
<input type="checkbox"/>	0.033	5ミリ秒	3	0	21.4 MB	2016/10/07 6:06:47	表示	ダイナミック
<input type="checkbox"/>	0	0ミリ秒	2	0	13.7 MB	2016/10/07 6:06:47	表示	ダイナミック

(Exercise 3) Create a guestbook Application

<https://cloud.google.com/appengine/docs/python/getting-started/creating-guestbook>

AppEngine Reference URL

- Online manual
 - <https://developers.google.com/appengine/>
- Getting Started Guide
 - [Java](#)
 - [Python](#)
 - [PHP](#)
 - [Go](#)

AppEngineReference URL

- Support
 - Community support [Stackoverflow](#)
 - [System status](#)
 - [Downtimenotify](#) (Fault information)

BigQuery Edition



Preparation

- ❑ A Google Cloud Platform project must be created
 - ❑ If it has not been created, click [here](#)
- ❑ Billing must be activated
 - ❑ If it is not enabled, click [here](#)
- ❑ "BigQuery API", "Google Cloud Storage", "Google Cloud Storage JSON API" services must be enabled
 - ❑ If they are not enabled, click [here](#)
- ❑ The command tool installation must be completed
 - ❑ If it is not completed, click [here](#)

Try Using BigQuery



Click the [Big Data]> [BigQuery] link from [Management Console](#)

Or,

Access bigquery.cloud.google.com

Launch the BigQuery Console

Try Using BigQuery

bigquery-public-data:samples is displayed on the left side of the screen

Click on the dataset.

Select the natality table below it and check the table structure (schema) displayed on the right side of the screen

The screenshot shows the Google BigQuery web interface. On the left, under 'Public Datasets', the 'bigquery-public-data:samples' dataset is selected, indicated by a red box. Below it, the 'natality' table is also highlighted with a red box. On the right, the 'Table Details: natality' page is displayed, also framed by a red border. This page shows the schema for the 'natality' table, including columns like source_year, year, month, day, wday, state, is_male, child_race, weight_pounds, plurality, apgar_1min, and apgar_5min, each with its data type and description.

Schema	Details	Preview	
source_year	INTEGER	REQUIRED	Four-digit year of the birth. Example: 1975.
year	INTEGER	NULLABLE	Four-digit year of the birth. Example: 1975.
month	INTEGER	NULLABLE	Month index of the date of birth, where 1=January.
day	INTEGER	NULLABLE	Day of birth, starting from 1.
wday	INTEGER	NULLABLE	Day of the week, where 1 is Sunday and 7 is Saturday.
state	STRING	NULLABLE	The two character postal code for the state. Ent
is_male	BOOLEAN	REQUIRED	TRUE if the child is male, FALSE if female.
child_race	INTEGER	NULLABLE	The race of the child. One of the following numbers: 1 - White 2 - Black 3 - American Indian 4 - Chinese
weight_pounds	FLOAT	NULLABLE	Weight of the child, in pounds.
plurality	INTEGER	NULLABLE	How many children were born as a result of this birth.
apgar_1min	INTEGER	NULLABLE	Apgar scores measure the health of a newborn from 1978-2002.
apgar_5min	INTEGER	NULLABLE	Apgar scores measure the health of a newborn from 1978-2002.

Try Using BigQuery

Click the Query Table button



New Query



Query Editor UDF Editor

```
1 SELECT FROM [bigquery-public-data:samples.natality] LIMIT 1000
```

RUN QUERY

Save Query

Save View

Format Query

Show Options



Try Using BigQuery

Query the natality table and look up the following information

1. How many people's data is included?
2. How many years of data is included?
3. What is the year with the most births?
4. Which states have the most births?
5. What is the average weight change per year?
 - a. Hint: Calculate the average with the AVG () function

Try Using BigQuery

Execute a query and check the following information

1. How many people's data is included?

```
SELECT COUNT(*) FROM  
[bigquery-public-data:samples.natality]
```

Try Using BigQuery

Execute a query and check the following information

2. How many years of data is included?

```
SELECT year  
FROM [bigquery-public-data:samples.natality]  
GROUP BY year  
ORDER BY year
```

Try Using BigQuery

Execute a query and check the following information

3. What is the year with the most births?

```
SELECT year, COUNT(*) as cnt
FROM [bigquery-public-data:samples.natality]
GROUP BY year
ORDER BY cnt DESC
```

Try Using BigQuery

Execute a query and check the following information

4. Which states have the most births?

```
SELECT state, COUNT(*) as cnt
FROM [bigquery-public-data:samples.natality]
WHERE state IS NOT null
GROUP BY state
ORDER BY cnt DESC
```

Try Using BigQuery

Execute a query and check the following information

5. What is the average weight change per year?

```
SELECT AVG(weight_pounds), year  
FROM [bigquery-public-data:samples.natality]  
GROUP BY year  
ORDER BY year
```

Try Using BigQuery

Check the query reference to see what sort of SQL can be executed.

Query Reference (Japanese version)

Query Reference

BigQuery queries are written using a variation of the standard SQL `SELECT` statement. BigQuery supports a wide variety of functions such as `COUNT`, arithmetic expressions, and string functions. This document details BigQuery's query syntax and functions.

Contents

Query syntax

[SELECT](#)

[WITHIN](#)

[FROM](#)

[FLATTEN](#)

[JOIN](#)

[WHERE](#)

[GROUP BY](#)

[HAVING](#)

[ORDER BY](#)

Supported functions and operators

[Aggregate functions](#)

[Arithmetic operators](#)

[Bitwise operators](#)

[Casting functions](#)

[Comparison functions](#)

[Date and time functions](#)

[IP functions](#)

[Logical operators](#)

[Mathematical functions](#)

Create a Table

Download the public data and load it into the BigQuery table.

- Earthquake data

<http://earthquake.usgs.gov/earthquakes/map/>

Creating a table

1. Click the setting button

2. Select magnitude 2.5+ for 30 days

3. Click "V" at the top left of the screen

4. Click the "Download Earthquakes" button, select "CSV" and download

USGS

30 Days, Magnitude 2.5+ Worldwide

Updated: 2016-07-05 05:34:38 (UTC)

Download Earthquakes

5km 2016

25km 2016-07-04 23:37:28 (UTC) 2.5 KM

3.0 23km NNE of Pinotepa de Don Luis, M... 2016-07-04 23:35:14 (UTC) 31.9 km

4.3 23km NNE of Isabela, Puerto Rico 2016-07-04 23:04:50 (UTC) 60.0 km

2.7 11km ESE of Luther, Oklahoma 2016-07-04 22:48:53 (UTC) 2.6 km

2.5 19km WSW of Rincon, Puerto Rico 2016-07-04 21:01:56 (UTC) 131.0 km

STATES MÉXICO CUBA Gulf of Mexico

Search Earthquake Catalog

Settings

Boomerang settings

Earthquakes

Auto Update

1 Day, Magnitude 2.5+ Worldwide

1 Day, All Magnitudes Worldwide

7 Days, Magnitude 4.5+ Worldwide

7 Days, Magnitude 2.5+ Worldwide

7 Days, All Magnitudes Worldwide

30 Days, Significant Worldwide

30 Days, Magnitude 2.5+ Worldwide

Creating a table

Create a new dataset and create a table below it.

- [BigQuery GUI Console](#)
- Click the ▼ button to the right of the project name and select "Create new Dataset"
- Enter the dataset name
Example: earthquake

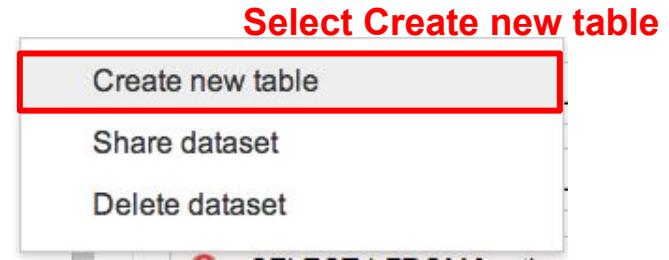
The screenshot shows the BigQuery GUI Console interface. At the top, the project name 'gcpbeginner-project01' is displayed. To its right is a dropdown menu with the following options:

- 3 GROUP BY year
- 4 ORDER BY year
- Create new dataset** (highlighted with a red box)
- Switch to project
- Refresh

A red box also highlights the '▼' button to the left of the project name. Below the project name, the message 'No datasets found in this project.' is shown, followed by 'Please create a dataset or select a new project from the menu above.' A modal window titled 'Create Dataset' is open at the bottom. It contains fields for 'Dataset ID' (set to 'earthquake'), 'Data location' (set to '(unspecified)'), and 'Data expiration' (radio buttons for 'Never' and 'In [] days.'). The 'Dataset ID' field is highlighted with a red box. The text 'Enter the dataset name' is overlaid in red at the top right of the modal. At the bottom of the modal are 'OK' and 'Cancel' buttons.

Creating a table

- Click the button to the right of the created Dataset and select "Create new table"
- The Create Table screen is displayed



Google BigQuery

COMPOSE QUERY

Query History
Job History

hajimemiyobq

▶ earthquake

Public Datasets

- ▶ bigquery-public-data:hacker_news
- ▶ bigquery-public-data:noaa_gsod
- ▶ bigquery-public-data:samples
- ▶ bigquery-public-data:usa_names
- ▶ gdelt-bq:hathitrustbooks
- ▶ gdelt-bq:internetarchivebooks
- ▶ lookerdata:cdc
- ▶ nyc-tlc:green

Create Table

Source Data

Location: File upload Choose file No file chosen

File format: CSV

Destination Table

Table name: earthquake Destination table name

Table type: Native table

Schema

Name	Type	Mode
	STRING	NULLABLE

Add Field

Edit as Text

Creating a table

- Select the source data

Source Data

1. Specify the file downloaded locally

Location	<input type="button" value="File upload"/>	<input type="button" value="Choose file"/> 2.5_month.csv (231737 bytes)
File format	<input type="button" value="CSV"/>	

2. Select CSV



Creating a table

- Enter the destination table information

Destination Table

Enter the table name (example: eq_20160705)

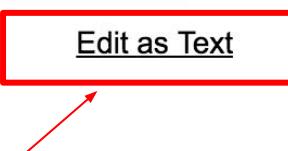
Table name	earthquake	▼	.	eq_20160705	?
Table type	Native table	▼	?		?

Creating a table

- Click “Edit as Text” and copy and paste the schema definitions of the next page

Schema

Name	Type	Mode
<input type="text"/>	STRING	NULLABLE
<button>Add Field</button>		
		<u>Edit as Text</u>

Click 

Creating a table

- Schema definition information (definition of data items and types)

```
time:string,latitude:float,longitude:float,depth:float,mag:float,magType:  
string,nst:integer,gap:float,dmin:float,rms:float,net:string,id:string,upd  
ated:string,place:string,type:string,horizontalError:string,depthError:str  
ing,magError:string,magNst:string,status:string,locationSource:string,m  
agSource:string
```

Creating a table

- Perform option settings

Options

Field delimiter	<input checked="" type="radio"/> Comma	<input type="radio"/> Tab	<input type="radio"/> Pipe	<input type="radio"/> Other	<input type="text"/>	<input type="button" value="?"/>
Header rows to skip	<input type="text" value="1"/>	<input type="button" value="?"/>	1. Since the first line of the source file is the column name, skip one line			
Number of errors allowed	<input type="text" value="0"/>	<input type="button" value="?"/>				
Allow quoted newlines	<input type="checkbox"/>	<input type="button" value="?"/>				
Allow jagged rows	<input type="checkbox"/>	<input type="button" value="?"/>				
Ignore unknown values	<input type="checkbox"/>	<input type="button" value="?"/>				
Write preference	<input type="button" value="Write if empty"/>		<input type="button" value="?"/>			
<input type="button" value="Create Table"/>	2. Click the Create Table button					

Creating a table

- Click "Job History" to check the status of the load job

The screenshot shows a user interface for managing data loads. On the left, there's a red button labeled "COMPOSE QUERY". Below it are two links: "Query History" and "Job History (1 running)". The "Job History" link is highlighted with a red border. On the right, under the heading "Recent Jobs", there is one listed job: "uploaded file to google.com:google-se-jp:earthquake.20140123". This job entry includes a small orange circular icon with a white play symbol, the word "Load", and the status message "uploaded file to google.com:google-se-jp:earthquake.20140123".

Check that the job is completed and has a green checkmark

This screenshot shows the same interface as the previous one, but the job status has changed. The "Job History" link is no longer highlighted. The listed job now shows a green checkmark icon instead of an orange play symbol, indicating completion. The rest of the interface remains the same, with the "Recent Jobs" heading and the job details including the file path.

Creating a table

- When you click each job, details are displayed, so check the status

The screenshot shows the Google BigQuery interface. On the left, there's a sidebar with 'COMPOSE QUERY' and 'Job History'. Under 'Job History', it lists 'gcpbeginner-project01' with a dropdown arrow, 'earthquake' (with a dropdown arrow), '20150614' (with a dropdown arrow), and 'publicdata:samples'. The main area is titled 'Recent Jobs'. It shows a table with one row highlighted by a red box. The row details a 'Load' operation that uploaded a file to the 'gcpbeginner-project01:earthquake.20150614' destination table. The table includes columns for Job ID, Start Time, End Time, Destination Table, Source URI, Source Format, Skip Leading Rows, and Schema. The schema is defined as follows:

Schema:
time: STRING
latitude: FLOAT
longitude: FLOAT
depth: FLOAT
mag: FLOAT
magType: STRING
nst: INTEGER
gap: FLOAT
dmin: FLOAT
rms: FLOAT
net: STRING
id: STRING
updated: STRING
place: STRING
type: STRING

NOTE: Creating a table (bq Command)

bq command: <https://cloud.google.com/bigquery/quickstart-command-line>

```
GSDIR="gs://kf-us"      ← You need to specify the Cloud Storage bucket in your project  
DATAFILE=$GSDIR/4.5_month.csv    ← You need to upload the CSV data to the bucket  
BQ_TABLE="eq.20140815"  
SCHEMA=`cat ./schema.txt`      ← You need to create the schema of the next page as a file  
GLOBAL_OPTIONS="--nosync"  
CMD_OPTIONS="--skip_leading_rows=1 --max_bad_records=0"  
  
bq $GLOBAL_OPTIONS load $CMD_OPTIONS $BQ_TABLE $DATAFILE $SCHEMA
```

NOTE: Creating a table (bq Command)

schema.txt (same as previously created earthquake)

```
time:string,latitude:float,longitude:float,depth:float,mag:float,magType:string,nst:integer,gap:float,dmin:  
float,rms:float,net:string,id:string,updated:string,place:string,type:string,horizontalError:string,depthErro  
r:string,magError:string,magNst:string,status:string,locationSource:string,magSource:string
```

Reference: Create a Partition Table

Partition table:<https://cloud.google.com/bigquery/docs/partitioned-tables>

Create a Table

```
$ bq mk --time_partitioning_type=DAY earthquake.eq
```

Load the data

```
$ bq --format csv load --skip_leading_rows=1 'earthquake.eq$20160705' $GSDIR/4.5_month.csv  
"time:string,latitude:float,longitude:float,depth:float,mag:float,magType:string,nst:integer,gap:float,dmin:  
float,rms:float,net:string,id:string,updated:string,place:string,type:string,horizontalError:string,depthErr  
or:string,magError:string,magNst:string,status:string,locationSource:string,magSource:string"
```

Reference: Create a Partition Table

Check the created partition

```
$ bq query 'SELECT partition_id FROM [earthquake.eq$__PARTITIONS_SUMMARY__]'
```

Similarly load the \$20160706, \$20160707 data and check the SQL display result below

```
$ bq query 'SELECT partition_id FROM [earthquake.eq$__PARTITIONS_SUMMARY__]'  
$ bq query "SELECT count(*) FROM [earthquake.eq] where _PARTITION_LOAD_TIME between timestamp('20160705') and timestamp('20160707')"  
$ bq query 'SELECT count(*) FROM [earthquake.eq$20160705]'
```

Create a Report in Datastudio

Access Datastudio

<https://datastudio.google.com/>

The screenshot shows the Google Data Studio Beta版 homepage. On the left, there is a large white button with a blue plus sign, labeled "新しいレポートの開始" (Start a new report) and "空白" (Blank). This button is highlighted with a red rectangular box. To the right of this button are several pre-made report cards:

- ACME** (Google Analytics): A dashboard showing site sessions, top countries, and driving channels.
- Search Console Report** (Search Console): A dashboard showing search traffic, search queries, and device breakdown.
- AdWords サマリー** (Google Adwords): A dashboard showing CTR, conversion rate, and cost per click.

At the bottom, there are navigation links: "すべて" (All), "自分がオーナー" (Owned by me), "共有アイテム" (Shared items), "ゴミ箱" (Trash), and a search bar with a magnifying glass icon and the word "検索" (Search).

Click "Start a
new report"

Create a Report in Datastudio

The screenshot shows the DataStudio interface. At the top left, the title "無題のレポート" (Untitled Report) is highlighted with a red box. Below it, the main menu bar includes "ファイル" (File), "表示" (View), "ページ" (Page), and "ヘルプ" (Help). The top right features standard window controls (close, minimize, maximize) and a "ビュー" (View) button. A user profile icon is also present.

1. Change the title of the report

The main workspace is currently empty. To the right, a modal dialog titled "データソースを追加" (Add Data Source) provides instructions: "データソースとは、グラフのデータの供給元です。既存のデータソースを選択するか、[新しいデータソースを作成] をクリックしてください。" (A data source is the provider of the data for the graph. You can select an existing data source or click [Create a new data source].)

2. Click "Create a new data source"

At the bottom of the modal, a blue button labeled "新しいデータソースを作成" (Create a new data source) is highlighted with a red box. Below this button, a search bar with a magnifying glass icon is visible. A list of sample data sources follows:

- [Sample] Google Analytics Data
- [Sample] World Population Data 20...
- [Sample] AdWords Data
- [Sample] YouTube Data
- [Sample] Rio Olympics Data
- [Sample] Firebase Analytics Data (...)

Create a Report in Datastudio



US birth information

ファイル 表示 ページ ヘルプ

無題のデータソース

..

コネクタ



ファイルのアップロード



AdWords



アトリビューション 360



BigQuery

承認

データスタジオに BigQuery プロジェクト
へのアクセス権を許可してください。

承認

2. (For first time only) Click the approval button to grant access

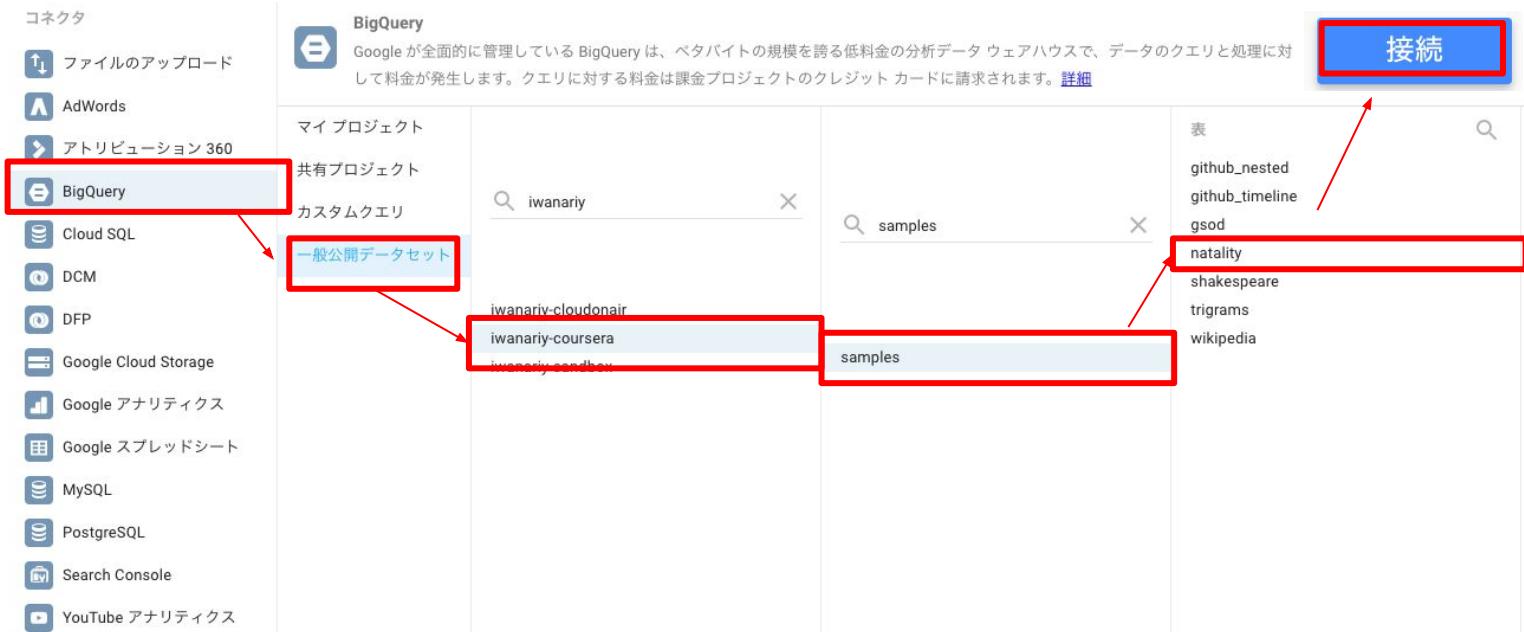
Create a Report in Datastudio

Create a data connection

Select the following:

BigQuery >
Public sample>
samples >
natality >
[Project created this
time]

Click the [Connect]
button in the upper
right



Create a Report in Datastudio

Create a data connection

natality natality 1. Change the data connection name to an arbitrary name

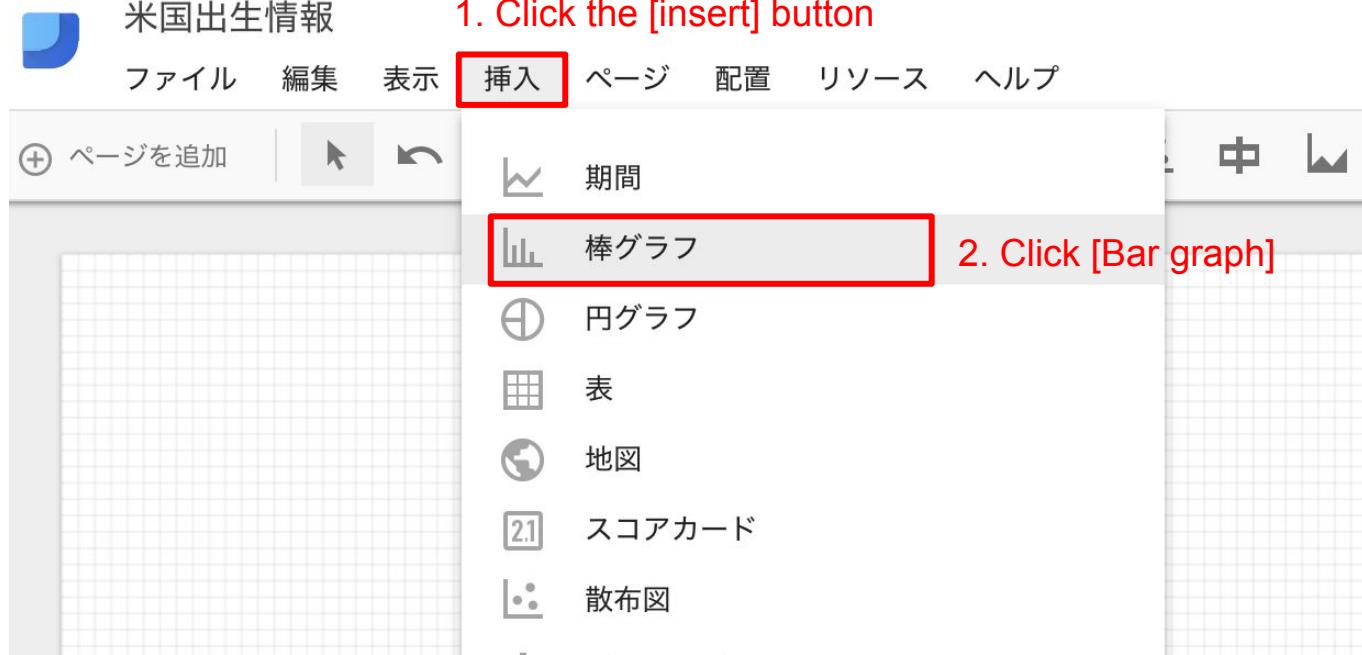
.... オーナーの認証情報を使用中 キャンセル レポートに追加

← コネクションを編集

2. Click the "Add to Report" button ?

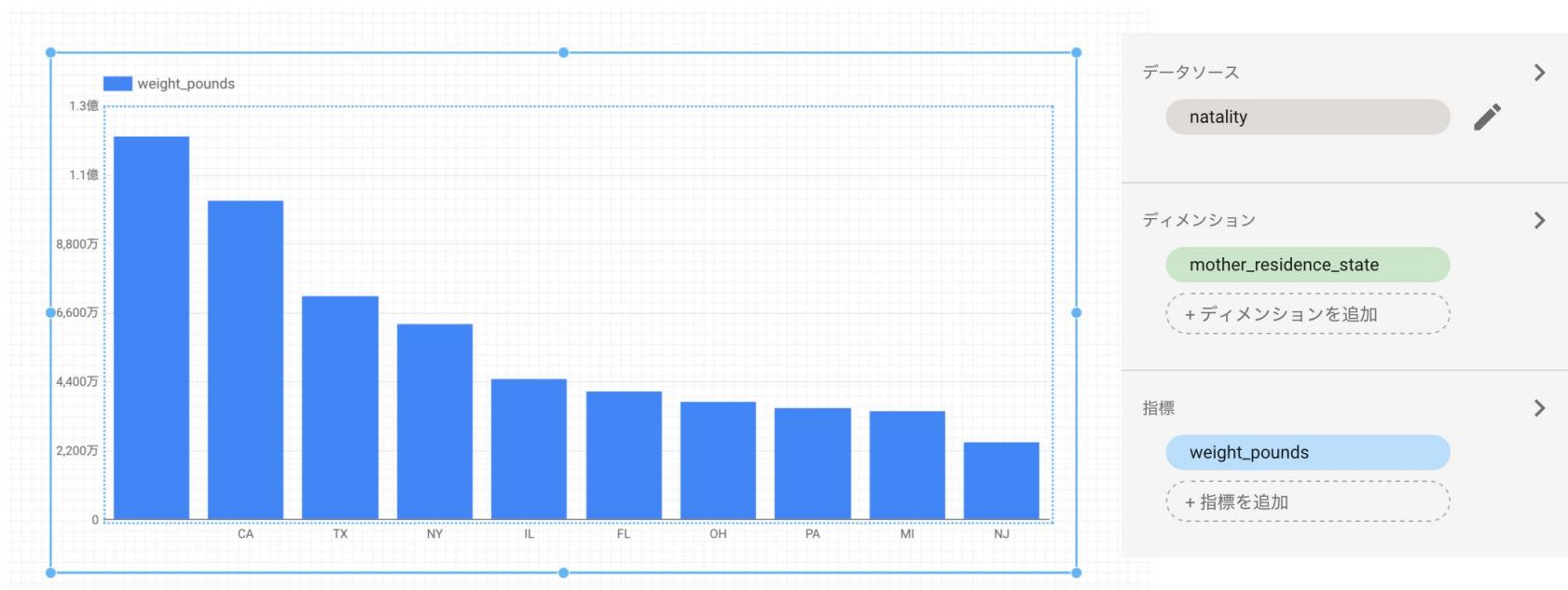
行 デッ クス	フィールド	タイプ	集計方法	説明
1	weight_pounds	123 数値	合計	Weight of the child, in pounds.
2	apgar_1min	123 数値	合計	Apgar scores measure the health of a newborn child on a scale from 0-10. Value after 1 min..
3	weight_gain_pounds	123 数値	合計	Number of pounds gained by the mother during pregnancy.
4	year	年 (YYYY)	なし	Four-digit year of the birth. Example: 1975.
5	apgar_5min	123 数値	合計	Apgar scores measure the health of a newborn child on a scale from 0-10. Value after 5 min..
6	mother_residence_state	RBC テキスト	なし	The two-letter postal code of the mother's state of residence when the child was born.
7	mother_married	×✓ ブール値	なし	True if the mother was married when she gave birth.
8	mother_age	123 数値	合計	Reported age of the mother when giving birth.
9	lmp	RBC テキスト	なし	Date of the last menstrual period in the format MMDDYYYY. Unknown values are recorded as ..

Create a Report in Datastudio



Create a Report in Datastudio

Dimensions and indicators are automatically selected and a graph is generated



Create a Report in Datastudio

What are dimensions and indicators?

Dimension:

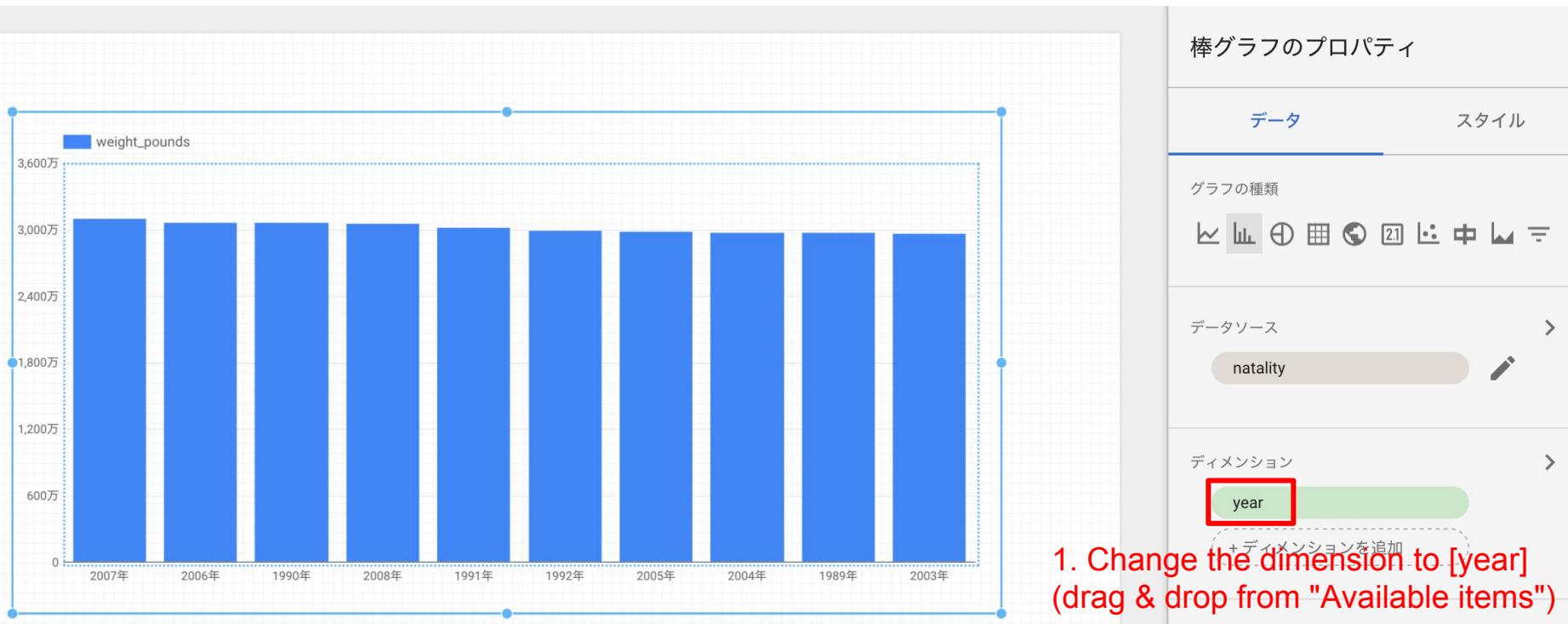
A data category. Each value of a dimension refers to a characteristic of a category such as a name or a description.

Indicator:

A measurement value. Indicates values such as total, count, ratio

<https://support.google.com/datastudio/answer/6402048?hl=ja>

Create a Report in Datastudio



Create a Report in Datastudio

1. Select indicator [weight_pounds]



2. Create a new indicator



3. Click the [Create calculation field] button

X	名前	カスタム フィールド名	ID	式数	②	項目を作成
イン デッ クス 1	フィールド	+ weight_pounds	calc_KJW660	タイプ	集計方法	説明
2	weight_pounds	計算フィールドを作成	23	数値	合計	Weight of the child, in pounds.
3	apgar_1min		123	数値	合計	Apgar scores measure the health of a newborn child on a scale from 0-10. Value after 1 min..
4	weight_gain_pounds		1コマ	数値	合計	Number of pounds gained by the mother during pregnancy.

Create a Report in Datastudio

Create a custom field

1. Enter item name: birth_count

名前

ID calc_CIY8GZJI

2. Enter formula: COUNT(is_male)

数式

3. Click the [Create field] button

Create a Report in Datastudio



Create a Report in Datastudio

Change the graph properties

Select the graph>
Bar graph properties>
Style>

Set the following:
Number of bars: 10
Show data labels: Turn on checkbox

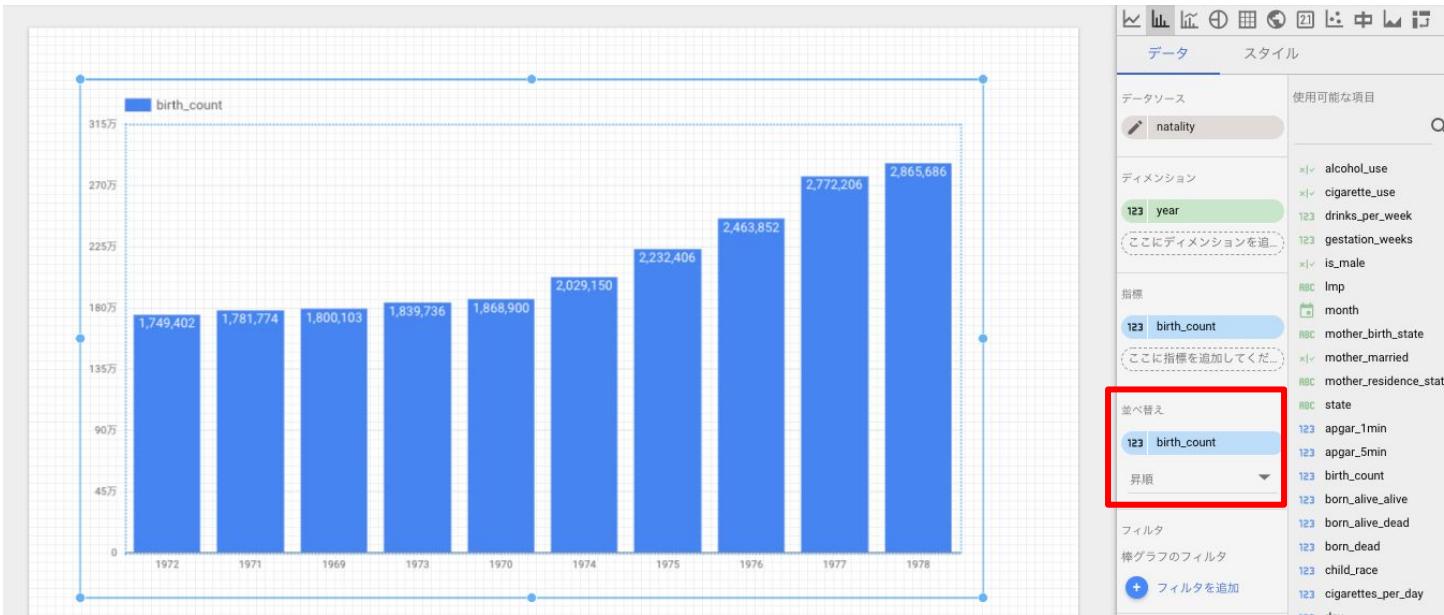


Create a Report in Datastudio

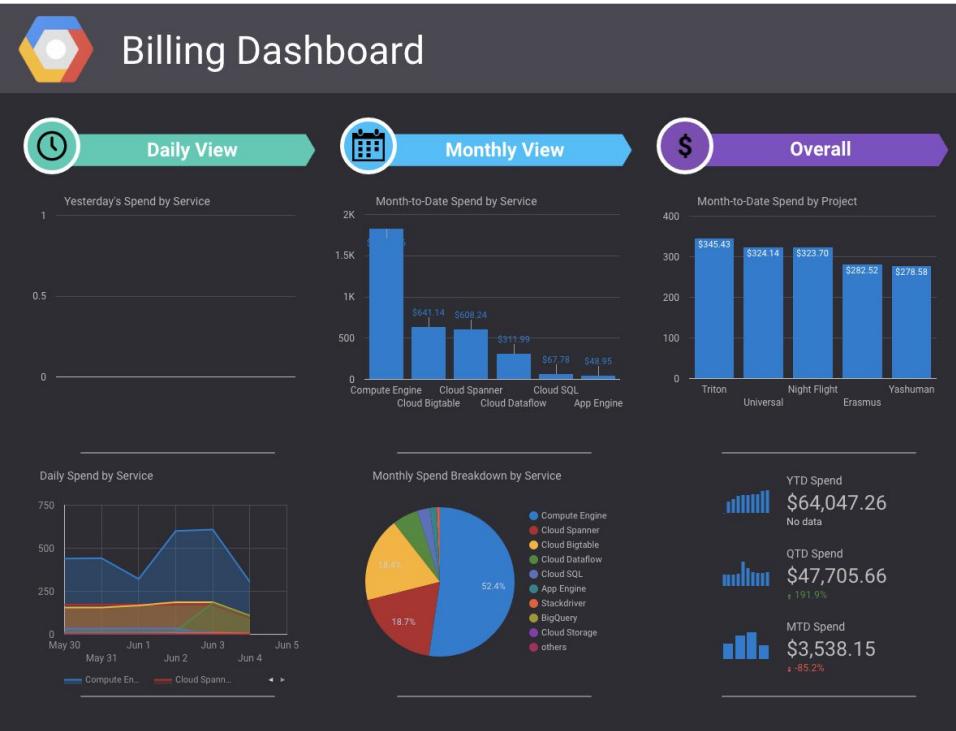
Change the graph sort order

Select the graph>
Bar graph properties>
Data>

Set the following:
Sort: year ascending



Reference: Datastudio Application Example GCP Billing

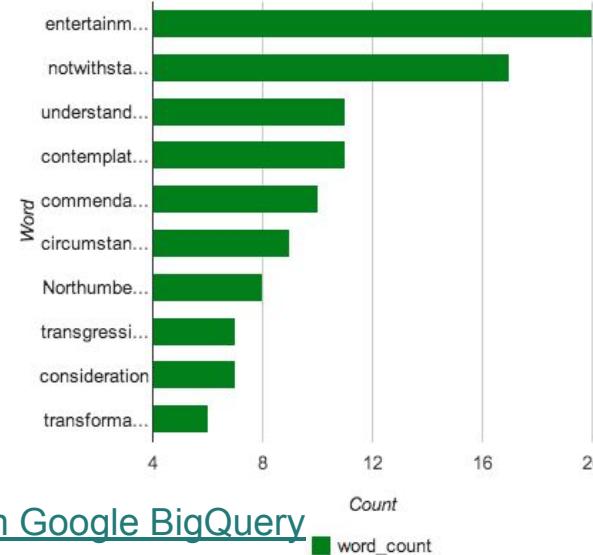


- Visualization of GCP billing status using Datastudio
- Organized by project and by product
- Applicable to your own environment from ["How to copy"](#)

Application Development (Google Apps Script)

An application that calls BigQuery from Google Spreadsheet and draws the result on a table or graph

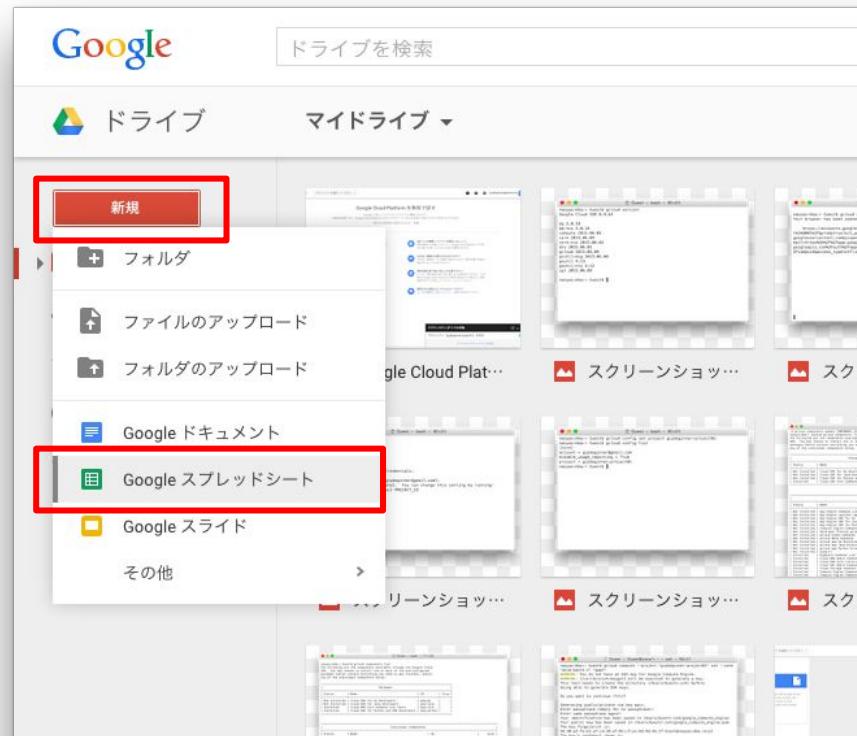
	A	B
1	entertainment	20
2	notwithstanding	17
3	understanding	11
4	contemplation	11
5	commendations	10
6	circumstances	9
7	Northumberland	8
8	transgression	7
9	consideration	7
10	transformation	6



[See: Tutorial: Update Spreadsheets with data from Google BigQuery](#)

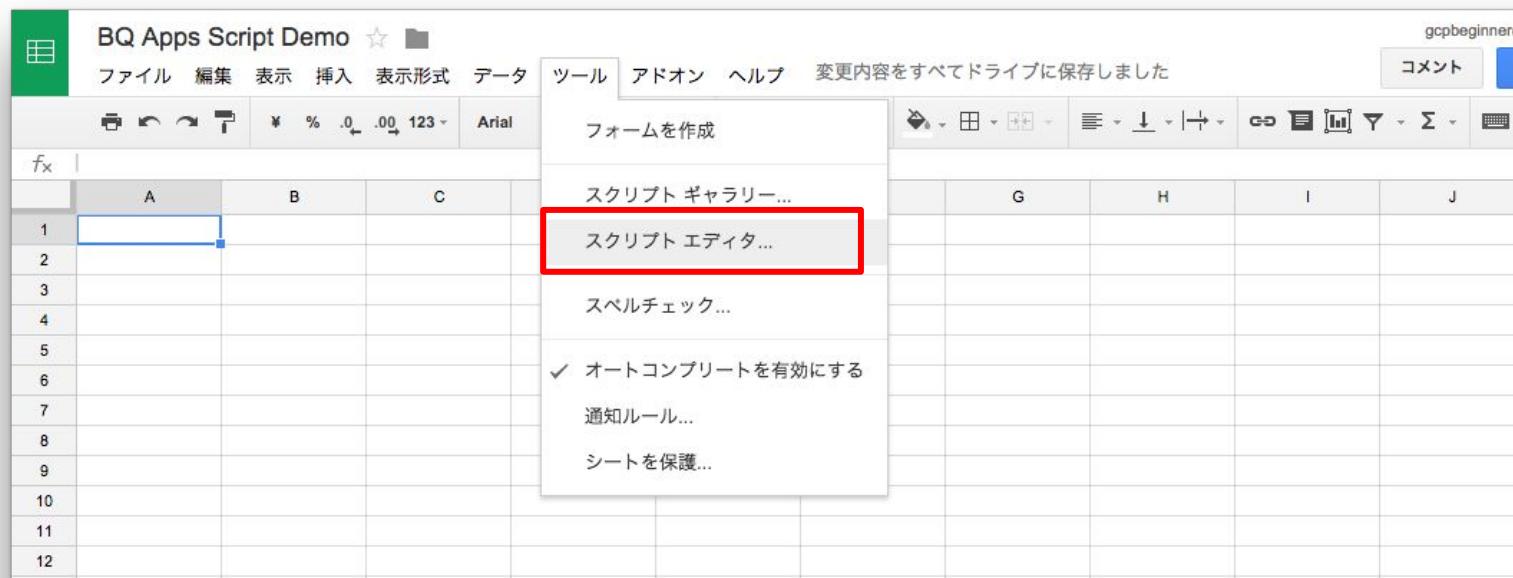
Application Development (Google Apps Script)

- Create a new spreadsheet
 - Access drive.google.com
 - "New">> "Google spreadsheet"
 - Change document name (optional)



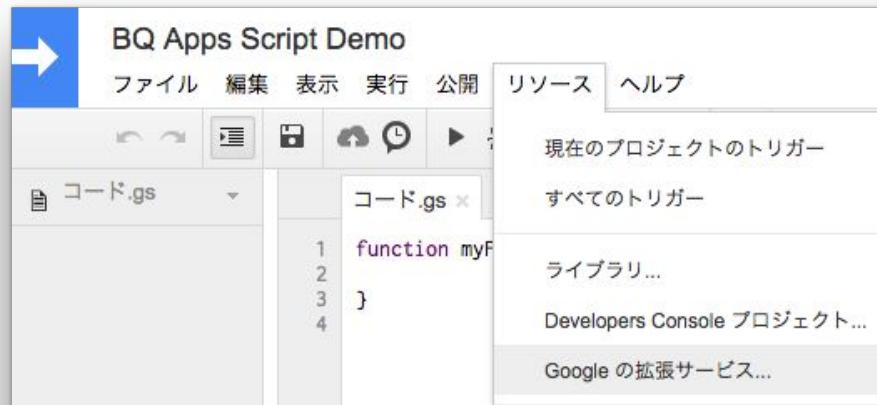
Application Development (Google Apps Script)

- Start the script editor
 - Tools > Script Editor



Application Development (Google Apps Script)

- Set resources available from the spreadsheet
 - Resources> Google extended services...



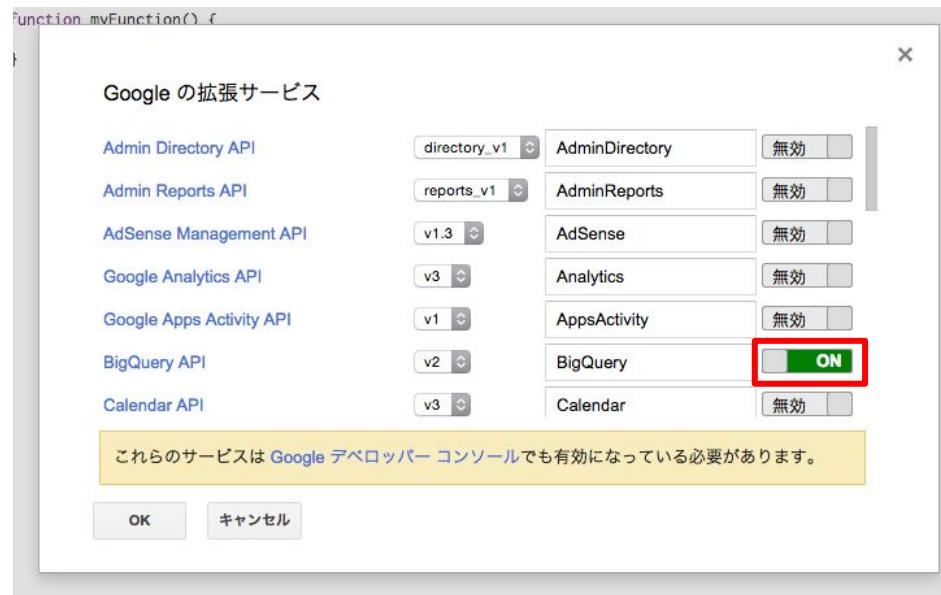
Application Development (Google Apps Script)

- Change the project name



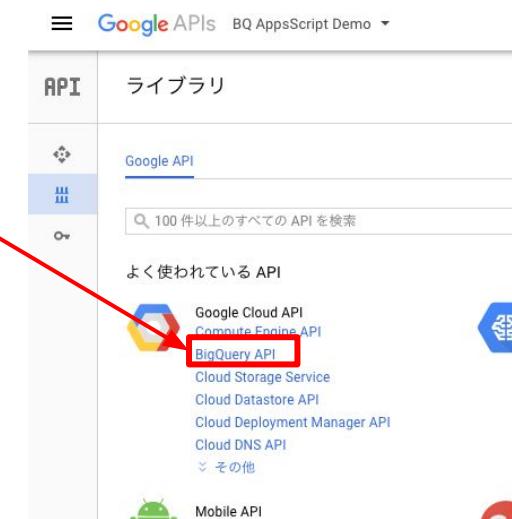
Application Development (Google Apps Script)

- Enable BigQuery API
 - BigQuery API> Click the Disable button to enable



Application Development (Google Apps Script)

- Enable BigQuery services in the Developer Console
 - Click on the Google Developer Console link
 - When the Developer Console opens, activate the BigQuery API



Application Development (Google Apps Script)

≡ Google APIs BQ AppsScript Demo ▾

API

← BigQuery API

▶ 有効にする



この API は Google

API

← BigQuery API

. 有効にしています

この API について



A data platform for cu

この API で認証情



OAuth 2.0 によるユー



この API を使用して、

データを分析する

この API は Google C

API

← BigQuery API

■ 無効にする



概要 割り当て

Application Development (Google Apps Script)

- Check the project number in the Developer Console
 - Right-hand menu -> set project
 - Note down the number as it is used in the script

The screenshot shows the Google Developers Console interface. On the left, there's a sidebar with various developer tools like '設定' (Settings), 'キーボードショートカット' (Keyboard Shortcuts), '利用規約' (Terms of Service), 'プライバシー' (Privacy), and a button 'プロジェクトを設定' (Set Project). A red box highlights the three-dot menu icon in the top right corner of the sidebar. A red arrow points from this icon to the 'BQ AppsScript Demo' project page on the right. The project page displays the 'BQ AppsScript Demo' name, its 'project-id' (redacted), and its 'project-number' (789, also redacted). A red box highlights the 'project-number' field. A red annotation at the bottom right of the page reads: 'Note down the number as it is used in the script'.

設定

キーボードショートカット

利用規約

プライバシー

プロジェクトを設定

⋮

Google APIs BQ AppsScript Demo

設定 削除

プロジェクト名 BQ AppsScript Demo

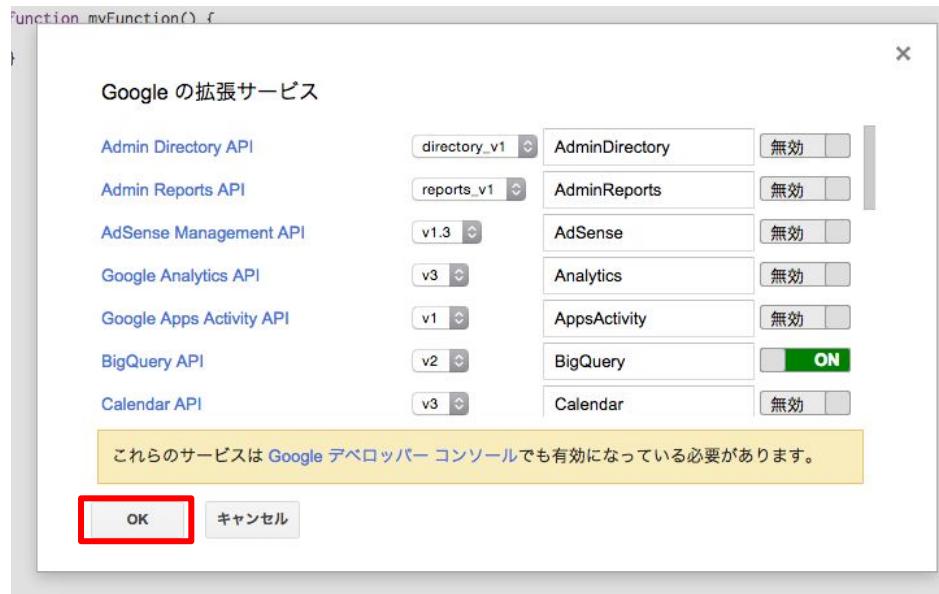
プロジェクト ID project-id-[REDACTED]

プロジェクト番号 789 [REDACTED]

Note down the number as it is used in the script

Application Development (Google Apps Script)

- Return to the script editor and exit the setting dialog
 - Click the OK button



Application Development (Google Apps Script)

- Copy and paste the following code into the script editor

(1/4)

```
//Substitute the project number that you noted down previously
var projectNumber = 'XXXXXXXX';

var ss = SpreadsheetApp.getActiveSpreadsheet();

function onOpen() {
  var menuEntries = [ {name: 'Run Query', functionName: 'runQuery'} ];
  ss.addMenu('BigQuery', menuEntries);
}
```

Application Development (Google Apps Script)

```
function runQuery() {  
  var sheet = SpreadsheetApp.getActiveSheet();  
  
  var sql = 'select TOP(word, 10), COUNT(*) as word_count from  
publicdata:samples.shakespeare WHERE LENGTH(word) > 12;';  
  
  var queryResults;  
  
  // Inserts a Query Job with an optional timeoutMs parameter.  
  try {  
    var resource = {query: sql, timeoutMs: 1000, userQueryCache: false};  
    queryResults = BigQuery.Jobs.query(resource, projectNumber);  
  }  
  catch (err) {  
    Logger.log(err);  
    Browser.msgBox(err);  
    return;  
  }  
}  
  
(2/4)
```

Application Development (Google Apps Script)

```
while (queryResults.getJobComplete() == false) { (3/4)
  try {
    queryResults = BigQuery.Jobs.getQueryResults(projectNumber,
queryResults.getJobReference().getJobId());
    // If the Job is still not complete, sleep script for
    // 3 seconds before checking result status again
    if (queryResults.getJobComplete() == false) {
      Utilities.sleep(3000);
    }
  }
  catch (err) {
    Logger.log(err);
    Browser.msgBox(err);
    return;
  }
}
```

Application Development (Google Apps Script)

(4/4)

```
// Update the amount of results
var resultCount = queryResults.getTotalRows();
var resultSchema = queryResults.getSchema();
}
```

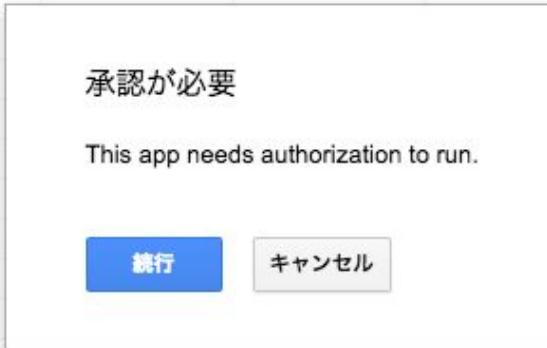
Application Development (Google Apps Script)

- Save the script
 - Click the Save button in the editor
- Run BigQuery
 - Go back to the spreadsheet and reload
 - When the BigQuery menu displays, click



Application Development (Google Apps Script)

- Perform OAuth authentication



- At this stage it is successful if no errors occur.

Application Development (Google Apps Script)

- Add the following code at the end of the runQuery function

```
var resultValues = new Array(resultCount);
var tableRows = queryResults.getRows();

// Iterate through query results
for (var i = 0; i < tableRows.length; i++) {
    var cols = tableRows[i].getF();
    resultValues[i] = new Array(cols.length);
    // For each column, add values to the result array
    for (var j = 0; j < cols.length; j++) {
        resultValues[i][j] = cols[j].getV();
    }
}

// Update the Spreadsheet with data from the resultValues array
sheet.getRange(1, 1, resultCount,
tableRows[0].getF().length).setValues(resultValues);
```

Application Development (Google Apps Script)

- Execute the added code and check the operation
 - BigQuery > Run Query

Application Development (Google Apps Script)

- Add the following function (buildDataTable) at the end

```
// Returns a Data Table from a query's result values and schema (1/2)
function buildDataTable(resultValues, resultSchema) {

  var dataTable = Charts.newDataTable();
  for (var i = 0; i < resultSchema.getFields().length; i++) {
    column = resultSchema.getFields()[i];
    columnName = column.getName();
    columnType = (column.getType() == 'INTEGER' || column.getType() == 'FLOAT')
      ? Charts.ColumnType.NUMBER : Charts.ColumnType.STRING;

    dataTable.addColumn(columnType, columnName);
  }
}
```

(Continued on next page)

Application Development (Google Apps Script)

(Continued from previous page)

(2/2)

```
for (var j = 0; j < resultValues.length; j++) {  
    dataTable.addRow(resultValues[j]);  
}  
  
dataTable.build();  
return dataTable;  
}
```

Application Development (Google Apps Script)

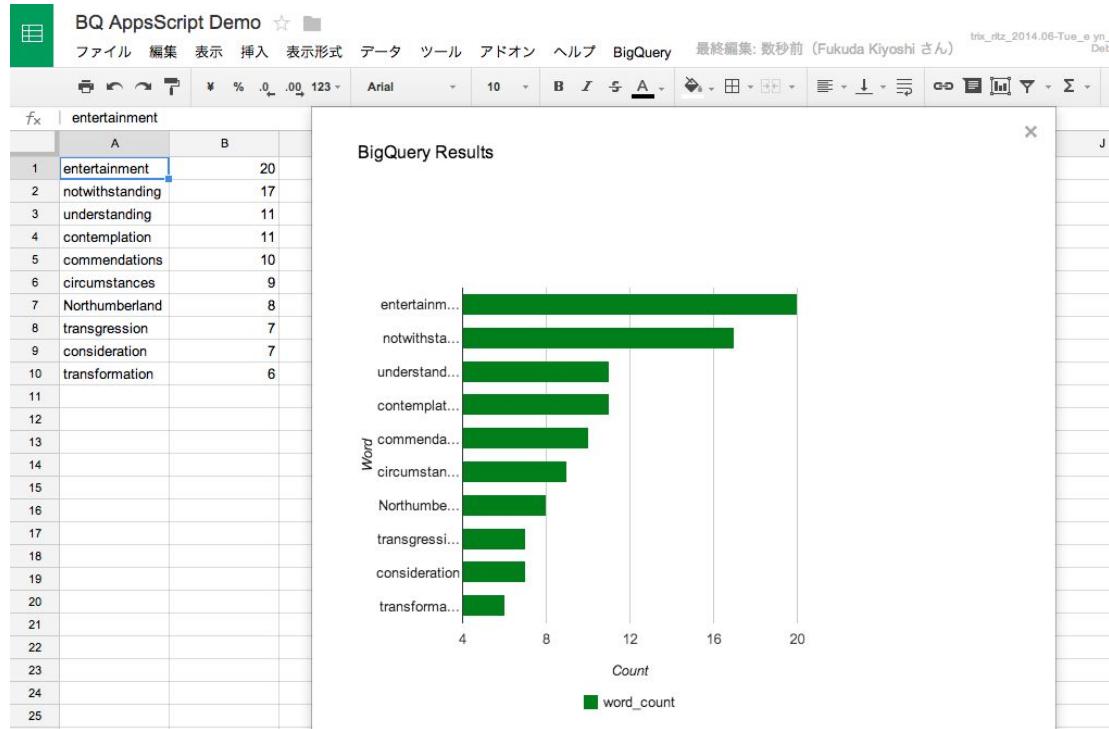
- Add code that uses the buildDataTable function to the end of the runQuery function

```
var bigqueryDataTable = buildDataTable(resultValues, resultSchema);
var chart = Charts.newBarChart()
  .setDataTable(bigqueryDataTable)
  .setColors(['green'])
  .setDimensions(500, 500)
  .setYAxisTitle('Word')
  .setXAxisTitle('Count')
  .setLegendPosition(Charts.Position.BOTTOM)
  .build();

var chart_panel = UiApp.createApplication()
  .setTitle('BigQuery Results')
  .setWidth('600')
  .setHeight('600');
chart_panel.add(chart)
ss.show(chart_panel);
```

Application Development (Google Apps Script)

- Execute



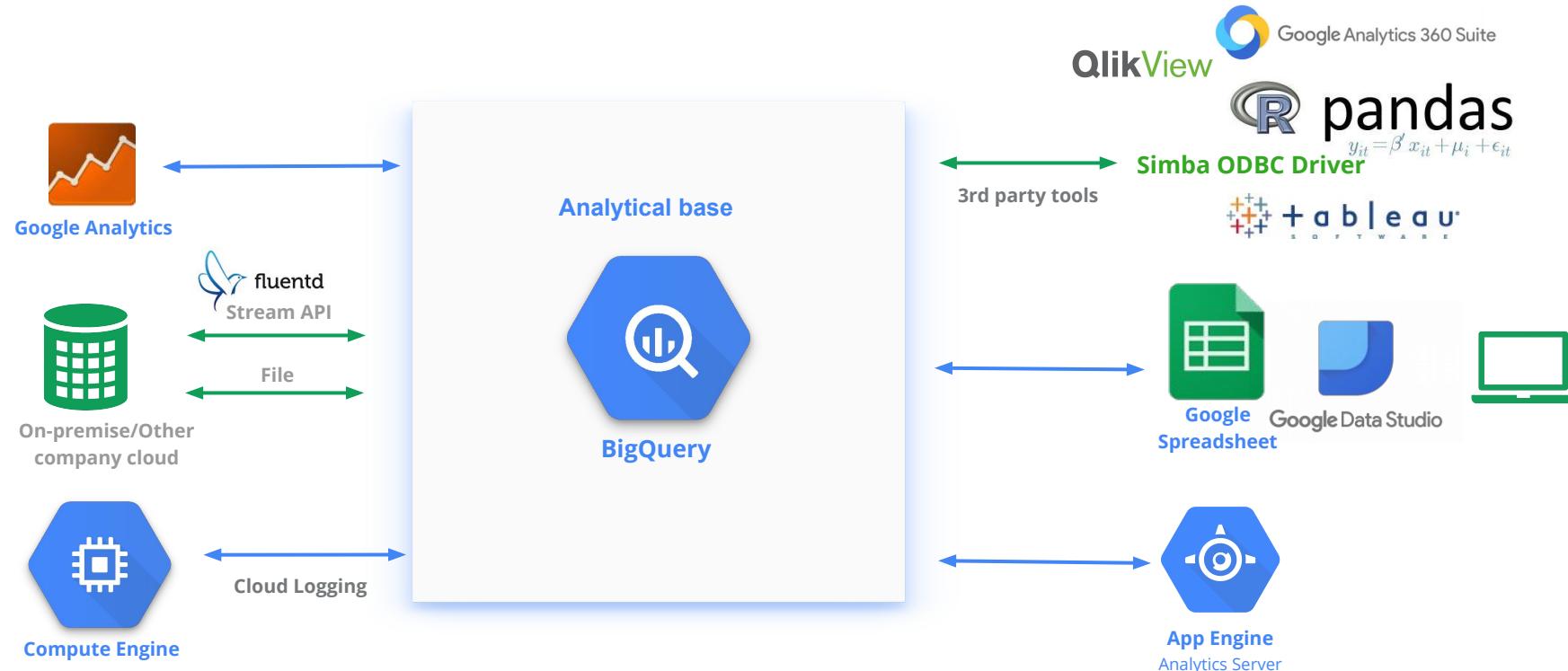
Features of BigQuery SQL

- Syntax similar to SQL standard
 - Updating and deleting per line not supported
 - Handle by deleting each table or writing to a new table
- UNION
 - You can UNION by separating table names with commas after FROM
- JOIN
 - If the table on the right is larger than 8 MB after compression, use Big Join (JOIN EACH syntax)
- GROUP BY
 - Queries that generate multiple groups may fail (Resources exceeded during query execution). In this case, use GROUP EACH BY

Features of BigQuery SQL

- COUNT DISTINCT returns a statistical approximation
 - COUNT([DISTINCT field [,n]])
 - Stringency can be improved by increasing n
 - The default value of n is 1000
 - It is a tradeoff between performance and accuracy
 - Use the EXACT_COUNT_DISTINCT() function
- Output size limit
 - 128 MB after compression. If it exceeds this, it can be avoided by outputting it to the table

NOTE: Overall Architecture



BigQuery reference URL

- Online manual
 - <https://cloud.google.com/bigquery/what-is-bigquery>
- Query Reference
 - <https://cloud.google.com/bigquery/query-reference?hl=ja>
- BigQuery Client Library
 - <https://cloud.google.com/bigquery/client-libraries>
- Support
 - [StackOverflow](#)
 - Mail group for notice of failure ([bigquery-downtime-notify](#))
- Related videos
 - http://www.youtube.com/results?search_query=BigQuery&sm=3

Cloud Storage



Preparation

- ❑ A Google Cloud Platform project must be created
 - ❑ If it has not been created, click [here](#)
- ❑ Billing must be activated
 - ❑ If it is not enabled, click [here](#)
- ❑ "Google Cloud Storage", "Google Cloud Storage JSON API" services must be enabled
 - ❑ If they are not enabled, click [here](#)
- ❑ The command tool installation must be completed
 - ❑ If it is not completed, click [here](#)

Try using Cloud Storage

Access the Cloud Storage Management Console

- Sign in to Developers Console
cloud.google.com/console
- Select Storage> "Storage"

ストレージ



Bigtable



SQL



データストア



Storage



Try using Cloud Storage

Create a bucket

- Click the [Create bucket] button
- Enter the bucket name
 - * Must be globally unique

The screenshot shows the 'Cloud Storage' section of the Google Cloud Platform interface. The top navigation bar has 'Cloud Storage' and 'バケット' (Buckets) selected. Below the navigation, there is a brief description of what buckets are used for. At the bottom, there are two buttons: 'バケットを作成' (Create Bucket) and 'または 詳細' (Or Details).

Cloud Storage では、非構造化オブジェクトを「バケット」という階層状のコンテナに格納できます。静的データを Cloud Storage から直接配信することや、他の Google Cloud Platform サービスのデータを Cloud Storage に格納することもできます。

バケットを作成 または 詳細

The screenshot shows the '新しいバケット' (New Bucket) dialog box. It includes fields for '名前' (Name) with placeholder text 'Cloud Storage のすべてのプロジェクト全体で重複していない必要があります。' (The name must be unique across all projects), 'ストレージクラス' (Storage Class) set to 'Standard', '場所' (Location) set to '米国' (United States), and '作成' (Create) and 'キャンセル' (Cancel) buttons at the bottom.

新しいバケット

名前
バケット名は Cloud Storage のすべてのプロジェクト全体で重複していない必要があります。

ストレージクラス
標準のバケットは可用性が高くなります。DRA バケットは、コストが少なく、特定の地域に配置できます。 詳細

Standard

場所 ②

米国

作成 キャンセル

Try using Cloud Storage

- Specify the storage class ([Standard] in this case)
- Designate a location ([Asia] in this case)
- Click [Create]

新しいバケット

名前
バケット名は Cloud Storage のすべてのプロジェクト全体で重複していない必要があります。

ストレージクラス
標準のバケットは可用性が高くなります。DRA バケットは、コストが少なく、特定の地域に配置できます。[詳細](#)

Standard

場所 ?
 米国

新しいバケット

名前
バケット名は Cloud Storage のすべてのプロジェクト全体で重複していない必要があります。

ストレージクラス
標準のバケットは可用性が高くなります。DRA バケットは、コストが少なく、特定の地域に配置できます。[詳細](#)

Standard

場所 ?
 アジア

Try using Cloud Storage

Upload the file

- Click the [Upload file] button
- Select the file in the local file system



Try using Cloud Storage

Confirm the file upload

バケット / gcpbeginner-bucket01

<input type="checkbox"/> ファイルをアップロード	<input type="checkbox"/> フォルダをアップロード	<input type="checkbox"/> 新しいフォルダ	<input type="checkbox"/> C	<input type="checkbox"/> 削除	<input type="checkbox"/> 前方一致でフィルタ...
<input type="checkbox"/> 2.5_month.csv		196.7 KB	text/csv	前回のアップロード 0 分前	<input type="checkbox"/> 一般公開 ⋮



Cloud Storage Reference URL

- Online manual
 - <https://cloud.google.com/storage/docs/overview>
- Getting Started
 - <https://cloud.google.com/storage/docs/getting-started-gsutil>
- Community
 - [StackOverflow](#)